FOOD INDUSTRIES

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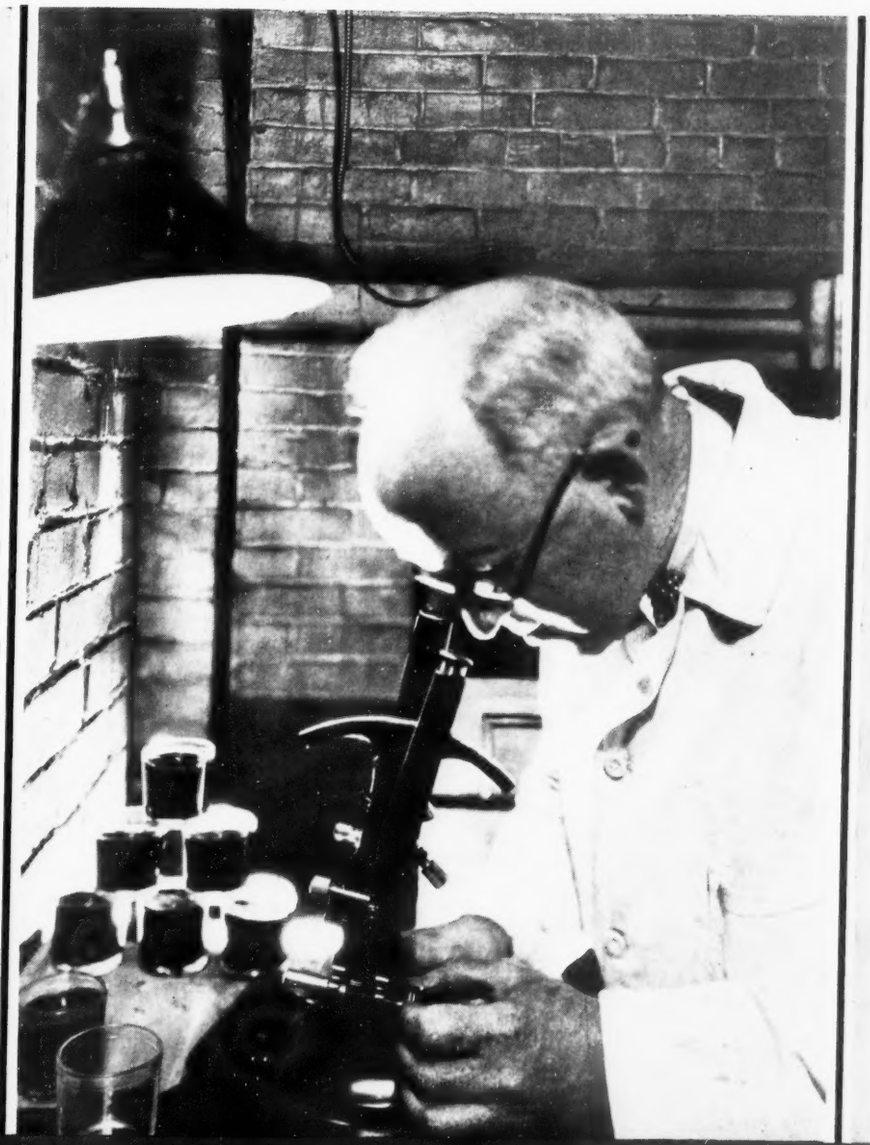

NOVEMBER
1931

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Cranberry Sauce
Bottle Washing

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VOLUME 3

FOOD INDUSTRIES

NUMBER 11

The Journal Devoted to the Problems of the Food Manufacturer

Contents for November, 1931

Producing Cocoa Butter by Pressing and Expelling 464
BY E. S. STATELER

Opportunity or Calamity?—Effect of the Southern Agricultural Situation on Food Manufacturing 467
AN EDITORIAL STATEMENT

Manufacturing Cranberry Sauce 470
BY MARCUS L. URANN

Good Drinking Water Pays Dividends 475
BY R. R. HOWARD

An Unemployment Plan That Works 477

Dehydration Costs for Fruits and Nuts 478
BY A. W. CHRISTIE

Scheduled Inspections—Preventive Maintenance—Lower Trucking Costs . 481
BY F. E. SPOONER

This Business of Pickling 484
BY W. B. WORMLEY

Washing Bottles in Modern Equipment 487
BY HERMAN A. WOLTERS

Bringing Quick-Freezing to Seasonal Crops 490
BY CLARENCE BIRDSEYE

Editorials 461	Patent Digest 495	Trade Notes 502
Current Literature 492	New Equipment 496	Personals 502
Government Publications 493	Manufacturers' Catalogs 497	Obituary 503
Book Reviews 494	News of the Month 498	New Construction 504

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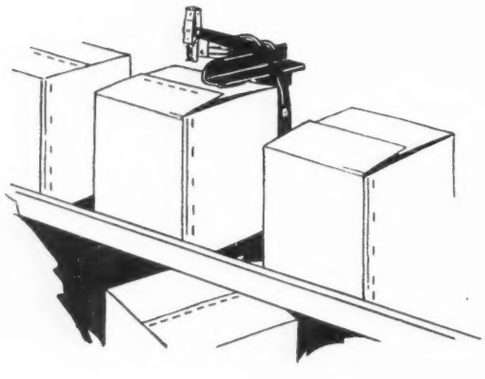

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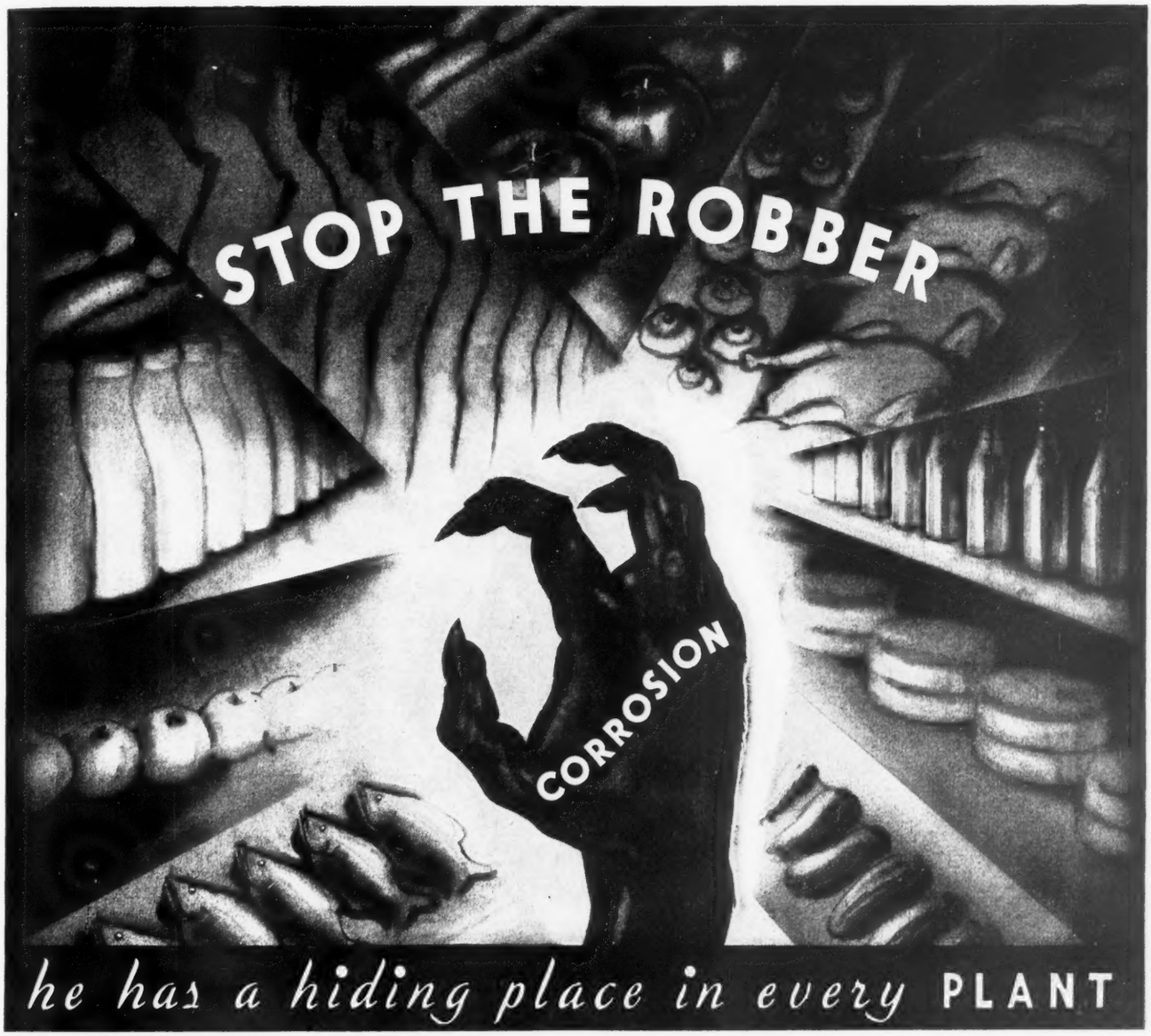

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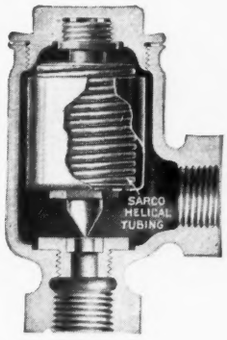

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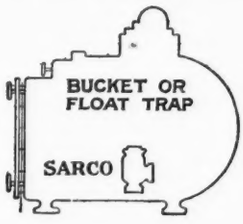

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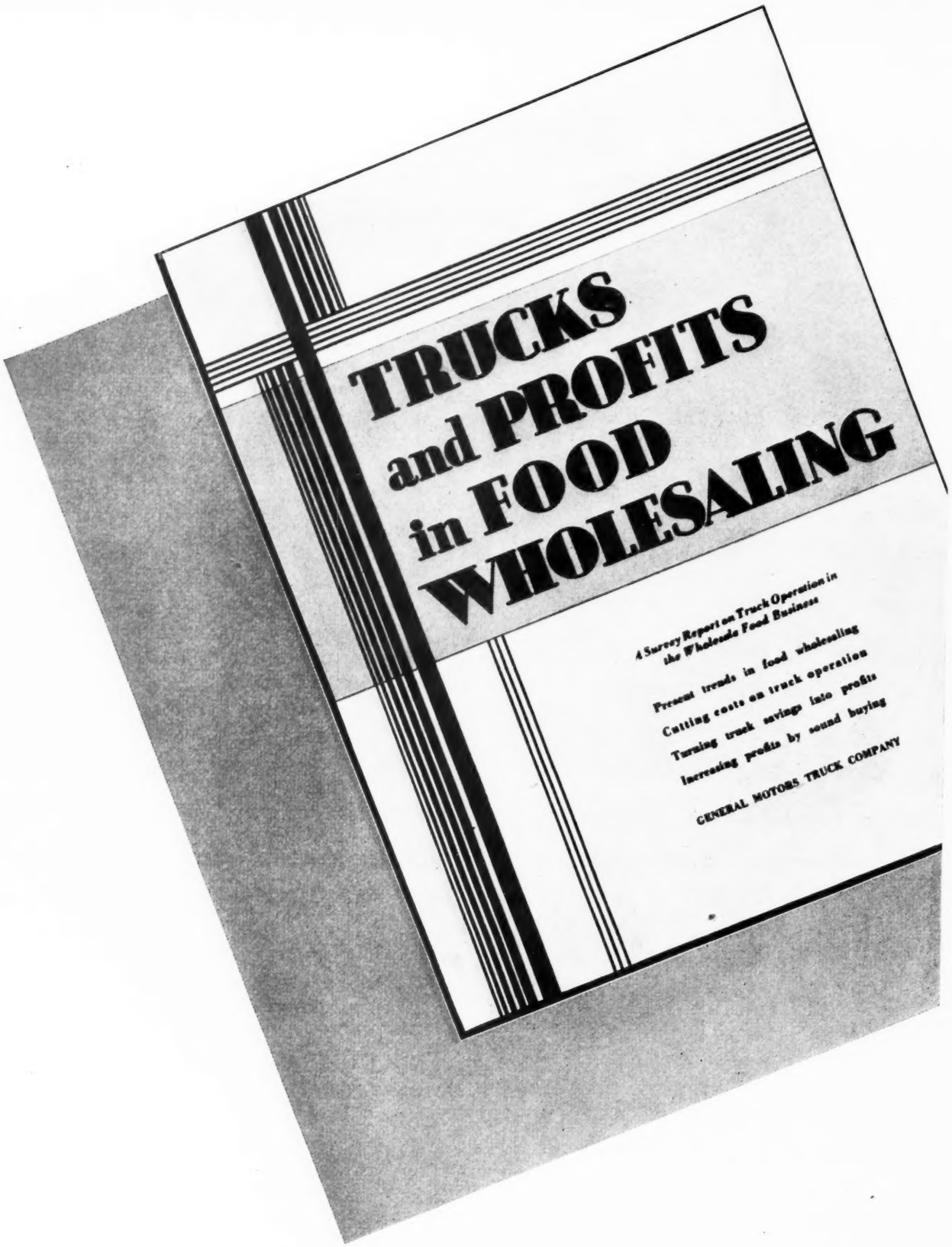
TRUCKS
and PROFITS
in FOOD
WHOLESALING
A Survey Report on Truck Operation in the Wholesale Food Business
Present trends in food wholesaling
Cutting costs on truck operation
Turning truck savings into profits
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BUILDERS OF COMMERCIAL VEHICLES EXCLUSIVELY

● **The General Motors Truck Company recently completed a two-year study of food wholesalers' truck operations in all sections of the country. Not only did they learn how to make trucks that would be of greatest value to you, they also found out which types and sizes of trucks are most economical in each class of service. Their reports include a wealth of facts and figures that will help you make a sound selection of truck *types*. Mail the coupon for a free copy of this report, or call in the General Motors Truck representative in your locality, and let him show you how an analysis of your particular needs, guided by the information presented in this report, can be applied for greater profits in your truck operations. Time payments financed at lowest available rates through our own Y. M. A. C.**

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Name_____

Firm_____

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City and State_____

This Warehouse Chopped its Labor Costs IN HALF

THIS warehouse serves 75 groceries in the Community Stores chain—*yet no receiving crew is needed!* Incoming merchandise flows—literally—over gravity conveyors from freight car to warehouse. Conversely, outgoing orders are assembled and, over other conveyors, move in quick precision to supply trucks for speedy delivery to the stores.

Hand trucking is abolished. There is no rehandling of stock. No time is lost while platform elevators slowly rise and fall. The cars discharge their loads to the upper floor of the warehouse. There, gravity conveyors complete the movement through all the various operations of storing and assembling.

Savings in labor? Inevitable, of course—as much as 50%—since the regular "inside" warehouse crew not only assembles outgoing orders but also has time to receive.

This saving is actual. Hence it has a vital bearing on the conduct of any kindred business in 1931. If you are interested, why not write for a copy of "Economies in a Grocery Warehouse"? It tells the *whole* story of what Lamson engineers accomplished for the Community Stores warehouse in Syracuse.

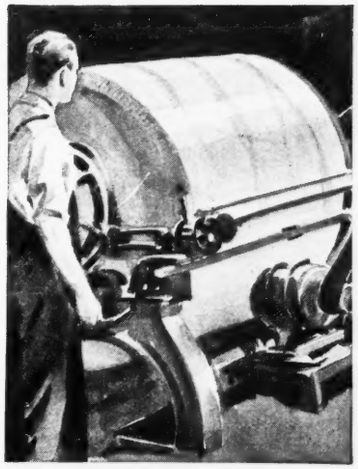
THE LAMSON COMPANY, Syracuse, New York

A nation-wide organization with offices in principal cities

LAMSON

Incoming merchandise rolls by conveyor from freight cars to storage. Bag merchandise slides down the chute to the first floor storage.

Cartons destined for storage piles flow over this gravity conveyor which extends the length of the warehouse.



● *Butter making is but one of the many branches of the food industry in which Diamond Crystal Salt has opened the way to greater success. We should be glad to send you detailed information regarding the selection of the salt best suited to your own product*

By year round purity *it holds its leadership*

SALT makers often strive to approach the purity of Diamond Crystal Salt. But since no other salt can be made by the exclusive Alberger process, no other salt is able to offer such high purity, day after day, week after week. Butter makers know the importance of using the salt that offers the greatest freedom from bitter tasting, grit producing impurities. And so

80% ***of the butter makers use this pure salt***

When four out of five butter makers single out the same salt, it *must* be better. As a matter of fact, the superior purity of Diamond Crystal is easily provable—not only in the chemical laboratory, but in the finer quality of the butter it produces. Here is the only salt which naturally consists of tiny, quick dissolving flakes. Here is salt so conspicuous in freedom from gritty impurities, so outstanding in the speed and evenness with which its unique flakes dissolve, so remarkable in the richer butter flavor it promotes—that it has become the standard of the whole butter making field. Are you taking advantage of its matchless benefits? Diamond Crystal Salt Company, (Inc.). *Bulk Department*, 250 Park Avenue, New York, N.Y.

Year in, year out, Diamond Crystal Salt averages 99.9% pure—or better

DIAMOND CRYSTAL SALT

A PRODUCT OF GENERAL FOODS CORPORATION

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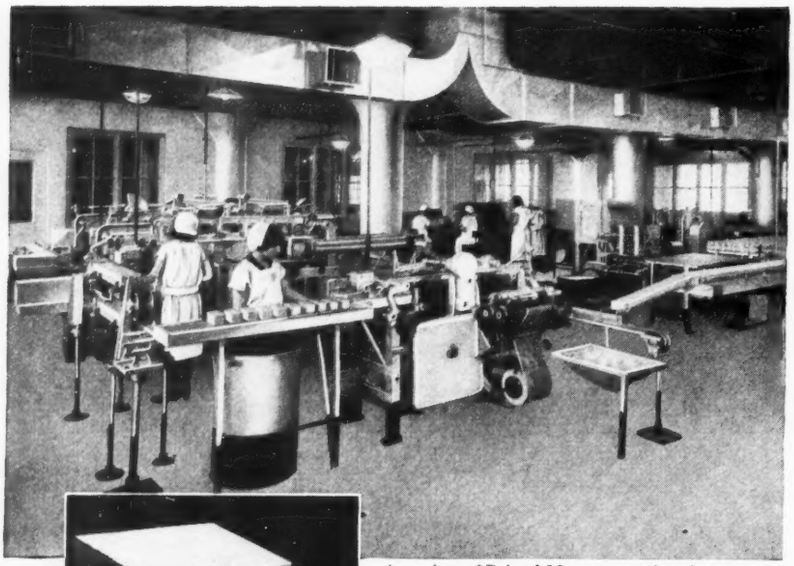

A section of Bristol-Myers wrapping department. The wax-wrapping machine in the foreground encloses the cartons in waxed paper, and the packages are then fed into the bundling machine, operated by the girl at the extreme left of the picture.

IPANA
Sal Hepatica
Ingram's
Shaving Cream

all products of Bristol-Myers Co.

Bristol-Myers wrapping department furnishes an interesting example of how wrapping machinery can help to meet a trade condition *economically.*

In recent years retail druggists have shown a decided preference for small-lot purchases, making it necessary to pack goods in dozen and half-dozen lots. Under these circumstances, the old method of packing the goods in display boxes proved expensive.

With the introduction of one of our bundling machines, which wraps a dozen or half-dozen packages in strong kraft paper, the Bristol-Myers Company *effected an immediate saving of* 46%. Orders for more machines followed in quick succession, and now this Company operates a battery of our machines to bundle Ipana, Sal Hepatica and Ingram's Shaving Cream (both tubes and jars).

Today our bundling machinery is recognized as "standard equipment" in the drug manufacturing field.

This is but one example of the various wrapping tasks performed by our machines. No matter what the nature of your wrapping problem may be, bring it to us—*solving problems built our business.*

PACKAGE MACHINERY COMPANY
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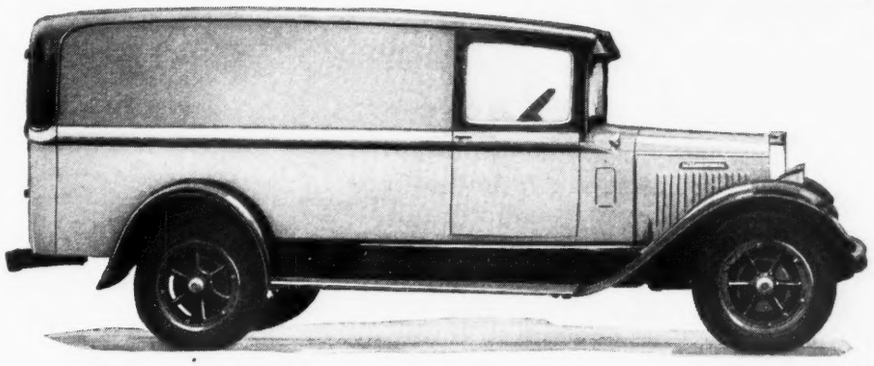
—in the low price range!



New Model A-2, a 1½-ton 4-speed International. The price of the 136-inch wheelbase chassis with standard equipment is

$675

f. o. b. factory

IN the building of high-grade motor trucks, International Harvester has advanced by what may well be called "leaps and bounds." Today this Company ranks high among the leaders in truck manufacture, making both speed and heavy-duty models for all hauling requirements. Three-fourths of the huge annual output of International Trucks is sold to industry and commerce, one-fourth to agriculture.

International Truck success is based on true quality, demonstrated economy and lasting satisfaction—and on SERVICE.

The largest Company-owned truck service organization in the world stands back of International Truck operation. Branches at 183 points in the United States and Canada, supplemented by thousands of dealers, provide a service that is of extreme value to the International owner. Whether he is in Syracuse or San Diego, in Seattle or Savannah, the same complete stocks, the same modern equipment for repairs and overhauling, the same expert attention at lowest costs are at his service at a neighboring International branch.

TODAY'S official new-truck registration figures indicate that International is increasing its leadership in truck manufacture and sales during 1931—growing tribute to these trucks and this service.

The full line of modern International trucks, of handsome design, and with absolutely no sacrifice in quality, is now available with a low schedule of prices made possible by quantity production.

Ask for a demonstration of the 1½-ton Model A-2 featured above, or any other International. Sizes range from ¾-ton to 5-ton.

BALTIMORE *or* BAKERSFIELD

International branches are established *to stay*. We may relocate to better the service, but we have never abandoned a territory. A view of the interior of one factory-standard service branch, in small town or large, is a view into them all—183 *Company-owned International branches*. And in-between are *hundreds of International Truck dealers*, with service ideals patterned after our own. The object of them all is to keep Internationals on the job at low cost—to keep International owners content with their trucks.

The International Branch at Baltimore, Md.

The International Dealer (A. H. Karpe) at Bakersfield, Calif.

INTERNATIONAL HARVESTER COMPANY
OF AMERICA (INCORPORATED)
606 S. Michigan Ave. Chicago, Illinois

INTERNATIONAL TRUCKS

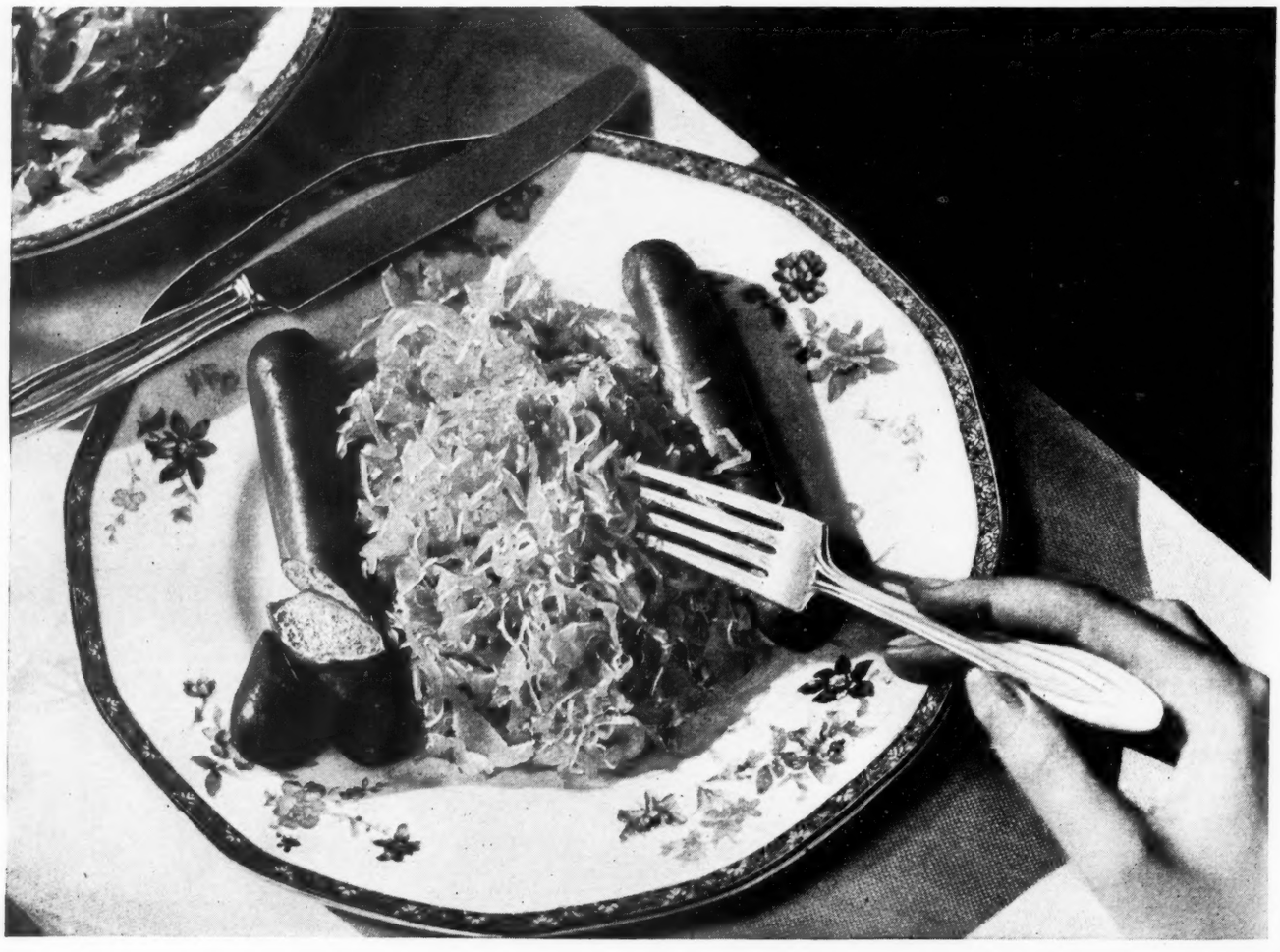
Canned Sauerkraut . .

THERE'S a tang and zest to well prepared sauerkraut that intrigues jaded appetites. Sauerkraut canners this season can work for bigger sales in no more effective way than through higher quality. If women get a tasty and delicious product when they buy a can it means more repeat orders for canners.

To insure even quality—there are several important details of preparation and canning that should be watched. Good ventilation is important if the cabbage is to remain in first-class condition—for during curing the cabbage needs plenty of air. Salting is a point to check carefully. Too much, as you know, slows up the curing process—too little promotes decomposition. There must be just the right amount to avoid either, and to secure uniform fermentation. Frequent determinations of acidity are valuable.

Our research department has devoted considerable time to the subject of sauerkraut canning. Special emphasis has been placed on the problem of hydrogen springers. Canners who have specific problems are urged to write in for needed help. We will be glad to cooperate to the fullest degree.

AMERICAN CAN COMPANY CANCO



FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 3.....Established 1928—McGraw-Hill Publishing Company, Inc.....Number 11

NEW YORK, NOVEMBER, 1931

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Laurence V. Burton, Editor

Obsolescence Under Attack

PROFITS of many food companies for the third quarter are unexpectedly good, as shown by the reports that have been issued to date. How can this be, in a period of depression, when retail prices are rapidly declining? There can be no question that, aside from the effect of the good volume of food consumption and the decline in raw-material costs, continued and successful striving to lower production costs deserves the credit for this showing.

TO DETERMINE how widespread is this movement toward lower costs, *Food Industries* recently asked a number of food manufacturers, large and small, as to what, if anything, they were doing to modernize their facilities and what objects they had in mind. Seventy-five per cent of the concerns replying are now carrying on modernization work, and one-quarter of all (including some of the most successful in the industry) state that they are so organized that, as fast as obsolescence is detected, improvements are made from funds regularly provided for that purpose.

AMONG THE ACTIVITIES occupying the attention of these forward-looking food processors are the modernization of production equipment, maintenance facilities, power production, process heating methods, motor applications, lighting, control, packaging methods, water supply, sewage and waste disposal methods, sanitation, electrical metering and other electrical equipment and storage facilities.

PRODUCTION EQUIPMENT, power applications, and packaging methods receive the greatest emphasis. Surveys made before improvements were commenced indicated to these manufacturers that these elements held the greatest degree of obsolescence and that, therefore, the greatest opportunity for reduction of manufacturing costs lay in their modernization. This checks with the expressed aim of most of the plants—the reduction of costs.

IF YOU VISIT many plants, perhaps even if you carefully inspect your own, the need for such action will be apparent. We have in mind a chocolate plant in which one operation involves a depositor producing 5,000 lb. of goods at an operating cost of $24.57 for a nine-hour day. This could be replaced by a machine producing 4,800 lb. for $6.30, but the old machine is in good repair and produces a satisfactory product, so the management is content. Too often the plant manager allows himself to assume an unquestioning attitude toward some of the equipment in his factory, thinking that, since it does its work without giving much trouble, it can be disregarded. The expense that follows such a course is often fatal to low-cost production and has even caused company failures.

WE ARE CERTAIN that the successful food manufacturers of the next few years will be those who now join or continue to fight the battle against obsolescence.

Thomas Alva Edison

IT is not often that a man makes such a deep impression on his times as did Thomas Alva Edison. The harvest of his years gathered, he has passed on; but his fame will not die, for Edison has become a world-wide synonym for scientific progress and invention. Primarily concerned as Edison was with the electrical industry, his work was fundamental to all industry. Food manufacture rests today upon the broad base of power application and good lighting that he fostered; and the food industries join a grateful world in acknowledging their debt to the achievements of a truly remarkable man.

Give the Product a Chance

WHEN a small and struggling concern whose executives are not technically trained puts out a new product which is not quite perfect there may be some excuse, although no justification, for the results; but when a large corporation with adequate research laboratories and a reputation for quality products makes a product which is only so-so, there is no possible excuse for doing so.

On account of the popularity of tomato juice last year and the cleaned-up condition of the 1931 market, a great many new firms have entered its manufacture in 1931. Among them are firms that ought to know all about it, and it is a pleasure to state that many of them have produced an excellent product. There are some, however, who failed to give the product a chance, despite the cautions that we have published in these columns.

For the benefit of those who are interested in the manufacture of tomato juice, we would again give warning that this is not a cheap product and direct particular attention to the fact that the core and stem of a tomato are not particularly palatable. For this reason the recovery of raw material in the finished goods can never even come close to 100 per cent if a juice is put out that will appeal to the public. There are several adjustments which need to be carefully watched when operating the machinery. Variation of these adjustments makes a vast difference in the quality of flavor produced, as well as in the color of the juice. We would suggest a little more research before rushing into this form of manufacture. Give the product a chance.

Introducing the Food Engineer

WHEN one considers the men who manage and operate the process industries which manufacture non-foods, such as paper, rayon, plastics, lacquers, and chemicals, it is apparent that these industries could not have developed to their present size and efficiency without the chemical engineer—the production man who understands not only the science underlying the conversion of one substance into another but also the technology of large-scale operations.

This valuable man is employed largely in the so-called chemical engineering process industries, because other industries have not seriously considered his worth. Although some food processing industries employ him to their great advantage, the proportion is still pitifully small. This may be attributed, in a measure, to the fact that many fail to understand that the manufacture of food is a process industry involving much chemical engineering and, further, fail to appreciate that it involves a most intricate and complex biological chemistry. It also involves bacteriological control. The chemical engineer who is trained in bacteriology is unusually well fitted for work in food production.

If the term "food engineer," instead of the term "chemical engineer," were applied to this highly trained production man, the food manufacturer would more quickly perceive what this kind of training could do for him. Let it be distinctly understood, however, that the food engineer or chemical engineer is not a routine laboratory chemist, although by training he is equipped to do analytical work. To use a food engineer in that capacity would be a great waste of ability. He has no business in the routine analytical laboratory.

During the current business depression a number of recently graduated food engineers are foot-loose. They should be snapped up by forward-looking manufacturers and built intelligently into their producing or research organizations or put to work at any job available today for later use in development work or operations. By carefully investing in their services at this time, the organization will be strengthened for the future days.

Opportunity Always Is Here

COMMENDABLY, many food manufacturers have sought not only to improve their procedure in point of sanitation, efficiency, and economy but have improved the products themselves and the packaging methods and packages. Their reward has been an ever-increasing volume of package goods business.

While these results are gratifying, there is still opportunity for further improvement. Recently a number of manufacturers have begun to extend the same care to bettering the nutrient value of foods, in line with the newer knowledge of nutrition. The dietetic worth of a food formerly was gaged largely by its calorific value; later we paid respect to "balanced" diet; then came the discovery of the vitamins and the rôle they play in metabolism. They hold the center of the stage today.

Meanwhile, much has been said and written of the evil of devitalizing foods through super-refining. The milling of flour has been particularly held up to scorn as a flagrant example of such degradation, while most breakfast foods have been criticized as being one-sided foods, consisting in the main of carbohydrates, thus serving chiefly as energy foods.

Whatever justification such criticisms may have would be eliminated by bettering their nutritional value so that a high carbohydrate content could no longer be regarded as the chief characteristic of such foods. For instance, an increased nitrogen content would cause them to be regarded as better sources of protein and amino acids for body sustenance and regeneration of tissue.

However, it is not necessary to stop here, for improvement seems equally desirable in another direction, closely related to vitamin content and irradiation: that of the mineral constituents. Discoveries in this field have come as rapidly as those pertaining to irradiation, and the interrelation between these two groups has acquired added significance from day to day. For a decade we have been told of calcium deficiency and its far-reaching consequences and, as a result, calcium therapy is now well established. The same holds true for the relation of iron to anaemia. More recently, copper, manganese, and other minerals have been found necessary to well-being.

Until recently, no food manufacturer would have thought of imparting an added vitamin content to his products. Yet this is now done commercially on a large scale. It seems fully as likely that, when the utility and practicability of a standardized mineral content of foods has been demonstrated, this improvement also will be made available to the manufacturer. When that is done there will be no more decrying of food "deficiencies." More nearly "complete" foods will be readily available everywhere, supplying everyone's daily need for nutrients that will adequately sustain and generally promote physical and mental well-being.

Receive and Load on Your Own Land

TRAFFIC problems, already acute, are constantly growing more serious. This means that factories, particularly those in metropolitan areas, must contemplate the time when they will not be able to receive and ship goods from loading platforms or at the curb on public streets. The long-time significance of the trend for the designer and builder of a plant is that he should lay out his interior arrangements, driveways, and shipping facilities to provide adequate receiving and discharging space entirely on his own property.

In making such provision, managements may at the outset be inclined to regard the change in system as a burdensome expense. In this connection, however, they should comfort themselves with the thought that good public relations include neighborly treatment of near-by firms and courteous arrangement with reference to passing traffic. They can write down on the credit side of their public-relations ledger the better good will which inevitably results from taking clumsy trucks off the highways while standing to receive or discharge their loads.

Furthermore, in programming for such facilities, managements should allot space with an eye to changing transportation conditions. More and more the truck for moderate hauls is replacing the freight car. Ample space should, therefore, be allotted to driveways and trucking areas, so that if and when automotive transportation increases at the plant it will not necessitate radical revisions of other plant facilities. An eye to the future in this regard costs nothing now and may save a great deal.

When Conventions Pay Dividends

A DEMONSTRATION of one of the real values of attending conventions occurred in July. Certain canners of peas saved in a single day a sum greater than their cash outlay in the last ten years for convention attendance as a direct result of the friendships formed with competitors from other parts of the country.

For many months the business of naming future prices for canned peas had developed into a sort of contest to name the lowest prices, and some absurdly low quotations have been made. The more able and courageous packers had given out price quotations that, while not in line with the lowest prices, showed so little profit that no one was pushing them hard. Then came the hot weather of June, and by July it became evident to canners that the late crop of peas was nearly ruined in certain important producing areas.

The trade in other parts of the country discovered this fact about a day too late to cover at the low figures. We were in a packer's office one day when an order came in for six carloads, priced at the low June figures, which was promptly declined by the seller, who pointed out to the prospective buyer that he had withdrawn all quotations by telegram 24 hours previously. The important thing to observe is that he had acted on advice from several friendly competitors who had wired him about their predicament. Over night the market had changed from a buyer's market to something that looked very different, with a strong probability of further sales at profitable prices instead of mere dollar swapping.

The point to this incident is that these very timely wires were exchanged between *friends* who meet very seldom except at conventions. Knowing one's competitor to the extent of inspiring the confidence shown here is a benefit of association work that cannot be gained by reading the printed proceedings of conventions. It pays to attend in person.

What Is More Important Than Flavor?

NO ONE attribute of food is more important from the standpoint of consumer acceptance than flavor and, contrariwise, no single attribute is less understood or is less studied. To say that we eat with our eyes may be stating a truism, but even more true is that fact that an unpalatable or indifferent flavor will negate all that good looks, artistic packaging, and careful manufacture may have contributed to the eye appeal.

If flavor is so important then why has so little been done about it? Why have not research laboratories been studying the all-important question of flavor? As far as our knowledge goes, only a small handful of food manufacturers have made any study of it. To be sure, it will be difficult to measure flavor, but we believe it would be very much worth while. Few lines of food manufacture exist that would not profit by knowing all about the flavor of their own product.

By knowing all about the flavor we mean: to know the identity and chemical composition of the flavor-producing constituents of food, where they come from, in what amount they are present, what causes their destruction or partial loss in processing or afterward, and can they be replaced, when deficient or entirely lost, by identical synthetic substances. Then there is the other side of the question. Some foods gain unpleasant flavors with age. How shall this be controlled?

Canners of peas sometimes pursue the goal of clear liquor in the can to the extent of blanching the peas until little flavor is left in them. Who can say how much it would mean to the industry to be able to retain or restore the lost flavor? It is worthy of thought because fresh peas are making serious inroads on the market for canned peas through flavor and color appeal. Meat packers have a wonderful opportunity for study of flavors, not only in cured but in fresh products. Here the problem of flavor control may possibly find its origin in the live animal and its foods, but who knows what the intelligent application of science may do in producing better flavored meat and meat products? Coffee is the outstanding example of what can be done, and we believe that this has been the first to be investigated simply because flavor is about all that a coffee roaster has to sell.

These are but a few suggestions out of the many that could be made. Many more will occur to our readers. The field is almost untouched and is waiting for the investigations of the research department. The job is a tough one, but the reward will be commensurate with the difficulty experienced.

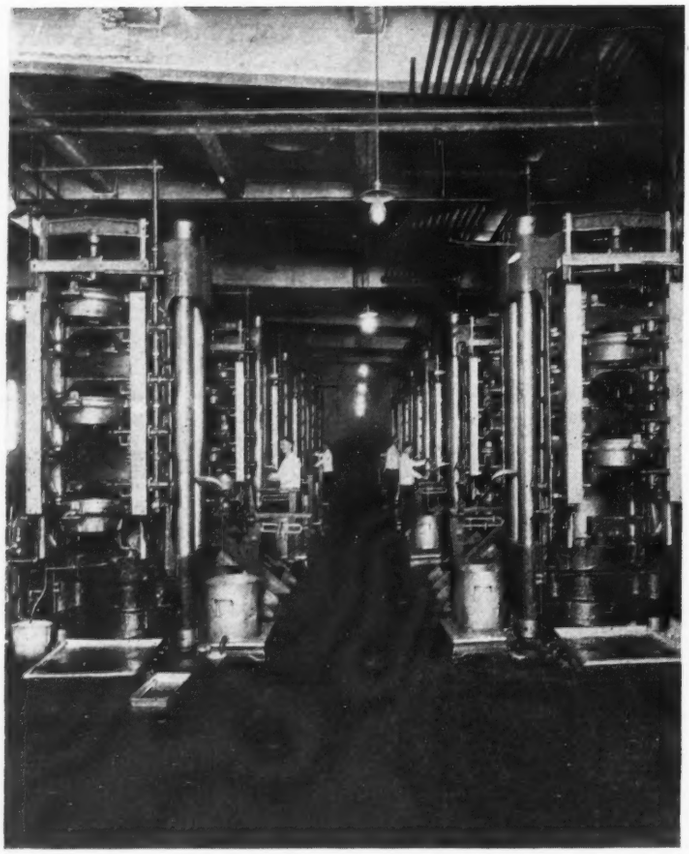


Fig. 1—A press room view, Hershey Chocolate Corp., Hershey, Pa.

Producing Cocoa Butter By Pressing And Expelling

By E. S. STATELER
Assistant Editor
Food Industries

EXPRESSION of fat from cocoa beans and other oil-bearing seeds is carried out largely by means of hydraulic presses. These presses operate on a batch basis and are of the horizontal or the vertical type.

The vertical type may operate manually or automatically in regard to filling and emptying the press pots, opening and closing of the pots as pressure is applied or released, and adjusting the pots so that the pressure of the ram is correctly applied to the pot bottoms. Presses of this type in use today vary from the low-capacity 4-pot model, capable only of producing cocoa cake with a fat content of approximately 25 per cent, to the strictly modern 10-pot model, that will hold a charge of 240 lb. of chocolate liquor and produce a press cake with a fat content as low as 8 per cent.

In horizontal presses is found a special adaptation of the familiar horizontal filter press so common in the chemical industries. Although they have a relatively high charge capacity in operation, they have a low production capacity and produce a press cake with a fat content of not less than 18 per cent. In actual operation they are now used to produce a high-fat cake from which breakfast cocoa powder having a fat content of 22 to 27 per cent is produced.

Regardless of the production capacity of the manually operated presses, each machine, to all practical purposes, requires the services of an individual operator, whereas the modern automatic models of vertical presses may be so operated that one operator takes care of a battery of four machines each using as much as 240 lb. chocolate liquor per hour for relatively low fat cake or 720 lb. liquor per hour for relatively high fat cake.

Continuously operating presses of the expeller type have been used quite successfully in the chocolate industry when only the cocoa butter was the desired product. Presses of this type depend upon direct worm action for expressing the fat through adjustable openings in the walls of the horizontal working barrel. The cake or low fat residue is discharged at the end of the worm through an orifice fitted with an adjustable cone which regulates the rate of flow of the material through the press and thus indirectly regulates the amount of pressure to which the nib material is subjected before it is ejected as spent cake. In the latest model the cone point has been replaced by a choke mechanism for the purpose of increasing the pressure on the cake and at the same time reducing maintenance and repair expense.

In past years this type of press has not been used as satisfactorily in the chocolate industry as in other industries engaged in expressing the fat from edible oil-bearing materials.

A few companies have obtained satisfactory performance from even the early designs of this type and have produced prime cocoa butter at a very low cost. The more recently developed models should give even more satisfactory performance for the manufacturer engaged in producing cocoa butter at a low cost with no thought of trying to market the resulting cake as a product for human consumption.

To obtain these favorable results the cocoa beans have to be as carefully prepared as if the nibs were to be used to make liquor for the pot presses. Also the expellers should be operated continuously 24 hours per day and the working parts must be given as much care and atten-

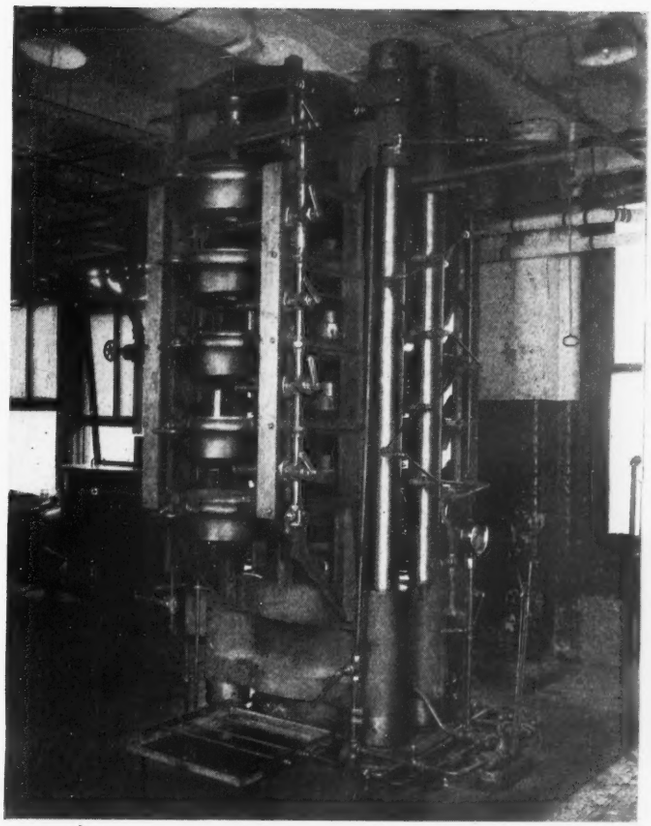


Fig. 2—Modern hydraulic cocoa butter presses have mechanized pot-filling and emptying attachments, automatic pot-closing springs, and built-in filter plates

Fig. 3—Below is shown a disassembled view of the built-in metal press plates

tion as are the working parts of the batch-type presses. Expellers may be operated in batteries of four machines for each operator, each using at least 250 lb. chocolate nibs per hour. Claims of 400 lb. per hour are made for the latest model which is designed to exert a pressure of 6 tons per sq.in. on the fat-bearing material and to produce a cake containing 7 per cent fat. Under careful operation the previous model would consistently produce cake with 8-10 per cent fat. If special precautions were observed this same model would produce cake containing only 6 per cent fat for a relatively short time.

The nature of the expeller press cake is such that it should not be regarded as desirable for use as a food or in food products for human consumption. When reduced to powder form, in as fine state as is possible to obtain, this residue has a gritty texture and is devoid of a pleasing cocoa flavor and appearance. For this reason the use of the expeller should be limited to those chocolate manufacturing concerns that are interested in using it only for the production of cocoa butter at a low operating cost.

Because there has been a demand for edible cocoa powder since the infant days of the chocolate industry, considerably more attention has been paid to the batch-type of press, with the result that today there are several models of the vertical presses in existence and operation, although they have been designed and built by an extremely limited number of manufacturers.

From the beginning these vertical presses were built to hold and press milled chocolate liquor in liquid form and to give a cake of such texture and flavor that when pulverized and bolted a powder desirable for food purposes was produced. At first only cake relatively high in fat could be obtained on the early presses, because they could withstand only comparatively low pressures. At present cake quite low in fat, as low as 8-10 per cent, yet quite desirable in texture and flavor, is obtained from finely milled and specially treated liquor by means of vertical presses built to withstand pressures from 6,000 to 9,000 lb. per sq.in. on the cake.

The less modern models of these presses consist of a series of telescope-bottomed steel cells or pots held in place by a steel frame, over a ram, so that pots can be manually clamped or wedged snugly on top of each other with heated platens between them and against the platen at the top of the supporting frame. Each pot is lined on the bottom with a camel's hair or fabric filter pad resting on the grooved upper surface of the telescope bottom. When charged it is filled with 20 to 30 lb.—depending on size of pot—of hot chocolate liquor, fitted with a top filter pad of camel's hair or fabric and manually screwed up against the heated platen above to keep the liquor hot and confined within the pot as the pressure of the ram is applied from below.

Each pot contains drain holes through which the pressed-out butter passes from the grooved surfaces of the pot bottoms and the under surfaces of the platens to a recessed portion of each pot which in turn drains to the recessed portion of the pot below and finally by means of a spout into a tub or large bucket placed on a weighing scale or on the floor near the base of the press.

One of the earliest moves by the industry to modernize the production of cocoa butter was the introduction of a centralized source of hydraulic pressure. This central or accumulator system is in principle a reservoir of oil under constant pressure that can be directed as wanted by the opening of a valve. Its rate of application is controlled by a needle valve so that the pressure on the bottom of the pots bears a definite ratio to the flow of butter from the chocolate mass in the pot. If the operator desires, he can stop the application of pressure when the predetermined quantity of butter has been obtained from each charge or he can let the pressure against the bottom of the pot continue to build up until the resisting pressure inside the pot is equal to the pressure in the system between the needle valve and the pumps. This

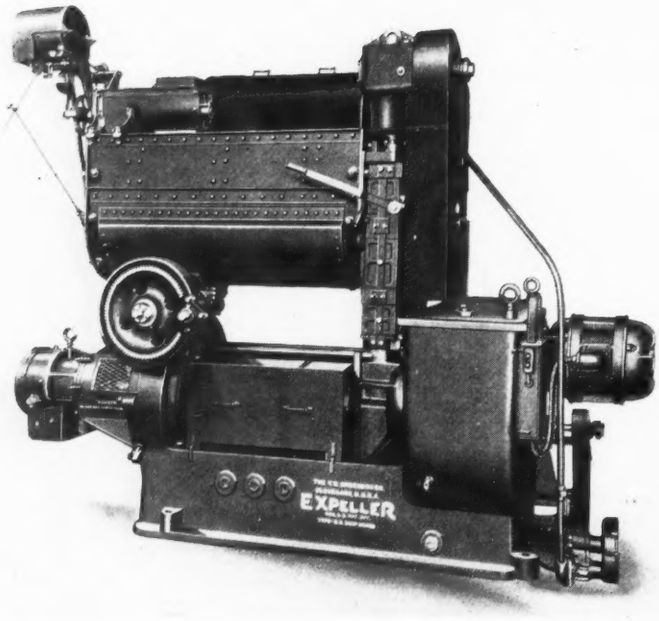


Fig. 4—Expeller-type presses have been extensively used for low-cost production of edible fats. The latest model for cocoa butter pressing is shown in illustration

pressure is approximately 6,000 lb. per sq.in. on the cake.

The introduction of this system increased the production capacity of these manually operated presses and paved the way for other mechanical means of eliminating laborious and time-consuming manipulations.

In the latest model of these presses the pots have built-in metal filter plates on the bottom of the platens as well as in the bottom of the pots themselves which not only eliminate the use of fabric and experimentally used metal press pads, with the several operator activities and difficulties that their use entailed, but also reduced the likelihood of so many leaks and blowouts while pressure was being applied in the early stages of the operation. They also eliminated fuzz and fibers so commonly found in press cakes made between fabric filter pads. As soon as the filled pots are pushed into place the adjusting springs automatically raise the pot until it fits snugly against the built-in filter plate on the bottom of the platen above and hold it there until the pressure of the ram becomes effective.

Most of the modernized older models and the new model are equipped with mechanical means of filling and discharging the pots so that now one operator can attend to a battery of presses and still discharge and fill the duplicate set of pots on each press while the press is in operation.

Also the time of pressing for a charge has been cut practically in half for the production of cocoa cake having the same fat content. This latter cut in production cost is probably due as much to a better understanding of the technique of pressing and of the use of pressure equipment as to the modernization in construction of the presses themselves. A better circulation of low-pressure steam for heating the platens is now regarded as more important to successful press operation than steam under higher pressure with resulting higher temperatures. Also more careful attention is being given to the physical and chemical state of the chocolate liquor to be pressed and, lastly, to the manner and rate with which the pressure of the ram is applied.

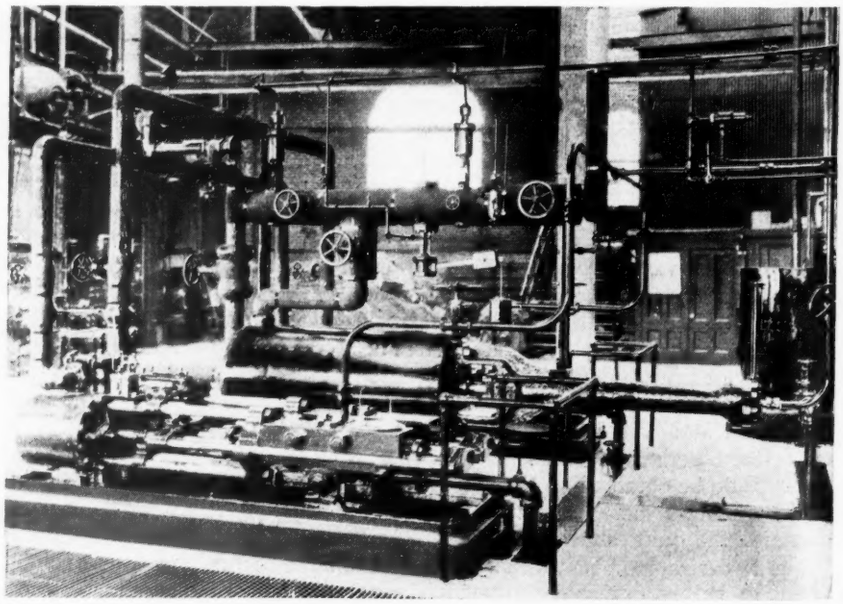
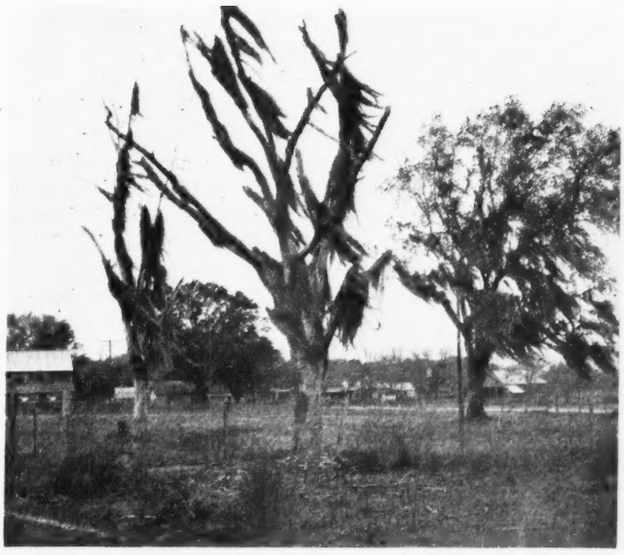


Fig. 5—The accumulator system provides a constant pressure for a battery of presses and makes possible a low and high-pressure cycle for each press

Opportunity—

Or Calamity?

What the Loss of a Billion-Dollar Market May Mean to the Food Industries — A Review of the Situation in Southern Agriculture



Typical Southern Farm scene

COMPELLING forces are at work toward a marked realignment of food production and distribution in the United States. One cannot view with complacence the 6-cent price of cotton which now prevails. Its importance is great enough to justify a warning sign in the office of every food manufacturer which will read: **"Beware of 6-Cent Cotton!"**

Distress in non-food producing agricultural areas must react unfavorably on other agricultural areas, as well as on food manufacturers, even in remote sections of the country. Whether this reaction will spell disaster or opportunity depends on many factors, not the least of which is the adaptability of the food manufacturers themselves.

What are the facts? Non-food agriculture differs economically from food-producing agriculture in the respect that cotton and tobacco, for instance, cannot furnish sustenance, yet the growers of such crops during the past 60 years have developed their agriculture to yield the largest cash crop possible at the expense of food crops. Taken as a whole, the ten states that constitute the Old South have gone in for too much non-food agriculture and have done it with open eyes.

Most Southern farmers have preferred to practice the one-crop agriculture, depending mainly on cotton or tobacco to furnish them with enough cash to pay the bill at the grocery store. The farmer's subsistence and that of his family and animals has thus become an integral part of the cost of his operations. The Southern farmer is in the astonishing position of buying for cash approximately $430,000,000 worth of food and feed* every year, most of which he could provide at small cost other than his labor.

*Estimate by Prof. S. H. Hobbs, Jr., University of North Carolina, at Institute of Public Affairs, University of Virginia, July 2, 1931. Food and feed purchases, by farmers alone, are computed by Prof. Hobbs from adjusted national consumption minus production.

AN EDITORIAL STATEMENT

Every year the entire population of these states "imports" foods and animal feeds from other states to the tune of $1,000,000,000* and *depends largely on crops that are not indispensable to pay the bill.* Therein lies the economic fallacy. Furthermore, there is nothing insurmountable about the character of the soil or climate that renders it necessary for the people of those states to purchase their foods from other states. In fact, great areas of the South are admirably adapted to highly diversified agriculture. No valid reasons can be advanced to account for the adverse balance of trade against Southern agriculture that exists. Only tradition and habit can explain the anomaly, but the present price situation will cause considerable change.

Leaders, both political and economic, have shouted themselves hoarse in urging "live-at-home" campaigns below the Mason and Dixon Line, but up to the present the cumulative effect of their efforts has been small. In many Southern counties the extent of total retail purchases runs in the order of $2,500,000 per county, while the cash crops, which constitute the only exportable value produced in them, have a value of only $2,000,000.* The unfavorable balance of $500,000 annually is accounted for by the constantly increasing load of farm mortgages.

Obviously, such a state of affairs cannot continue indefinitely, and in 1931 the show-down has come. Cotton is selling today for prices around 6 cents per pound, which represents a return to the farmer of around 5 cents and nets him absolutely nothing—or leaves him in debt. And tobacco treats him just as badly.

Cotton-growing areas are now faced with the alternative either of abandoning a part of their cotton acreage and producing their own food, or starving. As one spokesman has stated, "it is a case of 'root, hog, or die.'"

If, through sheer necessity, the South is compelled to feed itself, where will the food producers and food manufacturers from whom the South now purchases find a new market to replace the one that is slowly and surely slipping away?

Comprehensive statistical evidence of the situation is rather meager. One becomes aware of conditions in a largely qualitative way by the "feel," by observation, and from the opinions of the best Southern minds. Despite the large outside food purchases of Southern

*Estimate by S. H. Hobbs, Jr., University of North Carolina.

states, the food sales per capita or per store in those states are very small, as shown by Table I, which is adapted from Census Bulletin R-36, the preliminary reports of the 1930 Summary of Retail Distribution.

Table I—Food Sales by Geographic Groups

(From Bulletin R-36, U. S. Bureau of the Census)

Census Division		Population	Retail Food Sales	No. Food Stores	Dollar Food Sales per Store	Dollar Food Sales per Capita
Cotton Area	5	15,793,589	927,598,205	57,457	16,100	58
	6	9,887,214	415,022,371	26,262	15,800	42
	7	12,176,830	679,061,602	38,727	17,550	56
	1	8,166,341	1,005,006,179	41,246	24,600	123
	2	26,260,750	3,408,183,178	151,259	22,550	129
	3	25,297,185	2,669,936,361	98,637	27,100	105
	4	13,296,915	959,468,872	38,970	24,650	72
	8	3,701,789	308,772,255	10,723	28,750	83
	9	8,194,433	937,578,336	34,434	27,100	114
Total U. S.		122,775,046	11,310,627,359	497,715	22,800	93

Note: Divisions 5, 6, and 7 include the cotton states. Maryland, Delaware, Virginia and West Virginia are grouped by the Bureau of the Census in Division 5, which probably tends to introduce a value of purchases which is higher than the Southern average. Note the small per capita food purchases in the cotton states.

The most prosperous of the Southern states, North Carolina, has developed a certain amount of local data which is the only material of this type available. The December, 1929, circular entitled "The Production and Consumption of Agricultural Products in North Carolina," by Charles A. Sheffield, of North Carolina State College, Raleigh, N. C., is the source of much of the factual data in Table II. Remember that the figures are for North Carolina only, and that other Southern states are facing an identical problem but in a much more aggravated form.

North Carolina is more highly developed industrially than any other cotton-producing state. In the last two years, North Carolina also has greatly increased its production of food and feed crops, and has cut its cotton culture by nearly 250,000 acres. It is therefore less dependent than other states on higher prices for cotton or tobacco for prosperity. Yet, with this greater advantage of a sizable industrial population and reasonable diversification, the farmers of the state fail to produce enough food and feed crops for its needs.

Table II is compiled from data furnished by Mr. Sheffield and fragmentarily shows not only the deficit in local food production but the more important fact that production of food is on the increase.

What has happened since the Civil War in many parts of the South is indicated by the statistics for Lenoir County, N. C., given in Table III. In the old days, this was a typical plantation county, cultivated largely by slave labor. The figures show how it has been cut up into a large number of small farms, specializing mostly in cotton and tobacco.

In 1931 it has been estimated that this once prosperous county produces only half its food and imports approximately $2,000,000 worth each year.

Admittedly, 1925 statistics are not necessarily indicative of conditions today, yet in 1931 S. H. Hobbs, Jr., of the University of North Carolina, stated in a public address at Kinston, N. C.: "To my mind the greatest industrial opportunity North Carolina possesses today is to capture her local food market. . . . We import around $200,000,000 worth of food each year."

Table III—The 65-Year Change in Agricultural Production in Lenoir County, N. C.

Item	1860	1925
Farms	362	3,353
Improved land, acres	111,830	82,709
Milk cows, head	2,076	1,491
Other cattle, head	4,661	1,203
Sheep, head	3,266	467
Hogs, head	25,193	16,125
Corn, bu.	372,174	496,942
Tobacco, lb.	410	11,311,742
Cotton, bales	4,283	11,843

Data by S. H. Hobbs, Jr.

An excerpt from an editorial in the Charlotte *Observer,* Sept. 7, 1931, describes the situation:

"While there is an uncomfortable surplus of cotton and tobacco, however, the people of this section, farmers included, are hiring literally thousands of farmers in Wisconsin, Minnesota, Iowa, Kansas, and other Western states to produce for us a considerable part of our requirements of dairy products, canned goods, and even grain, hay, and mixed feedstuffs. These imports into North Carolina alone amount to approximately $160,000,000 a year.

"This situation would be ridiculous if it were not so tragic. To get a 'close-up,' just picture one definite farmer in North Carolina raising cotton or tobacco for a market that is already glutted while he pays a farmer in Minnesota to produce his butter and condensed milk; a farmer in Kansas to produce his wheat; a farmer in Iowa to supplement his meager corn crop; a farmer in Ohio, or Maryland, to grow his vegetables and haul them to a cannery—and then pays two or three dealers for handling them and one or more railroads for transporting them."

From the Department of Agriculture and Industries of Alabama comes the following letter: "It would be well for other sections of the country to realize that the South as a market for food and feed will decrease very rapidly during the next few years." This lends strength to the idea that food growers and processors in other parts of United States will largely lose their present Southern market.

The Governor of Arkansas, Harvey Parnell, writes us: ". . . You are advised that the State of Arkansas is in most excellent condition this year in so far as the farmers have provided their own foodstuffs and feed.

"It has been a very wonderful crop year, and the pantry shelf fairly groans under its load. . . . It would be, I believe, a fair statement to say that approximately a two-year supply of canned foods is now on the shelf. . . ." (A correspondent from North Carolina writes that Governor Parnell's remark also applies to most of the South, east of the Mississippi River.)

"The low prices of cotton for the past several years also have tended to teach the people in the rural districts the value of raising their own sustenance, as the prices received for cotton would not permit of sufficient purchasing power."

Table II—Some Shortages in North Carolina Food Production*

Commodity	Production			Estimated Deficiency From Total N. C. Needs		Estimated Deficiency Per Cent	
	Actual, 1925	Actual, 1930	Forecast, 1931	1925	Forecast, 1931	1925	Forecast, 1931
Wheat, bu.	4,342,351	4,288,000	6,180,000	8,256,417	5,820,000	65.6	49
Corn, bu.	44,400,000	51,865,000	59,198,000	12,243,200	None	25.3	0
Oats, bu.	.....	6,520,000	8,180,000	.....	6,820,000	....	46
Sorghum, gal.	.....	1,230,000	1,900,000	.....	10,100,000	....	84
Irish potatoes, bu.	4,424,000	8,590,000	10,544,000	537,000	?	10	?
Sweet potatoes, bu.	.....	10,506,000	12,075,000	.....	Surplus	....	Surplus
Hogs	872,000	.....	.....	512,460	.....	37	..
Milk, gal.	108,151,634	.....	.....	214,778,366	.....	66	..
Eggs, doz.	25,587,169	.....	.....	21,935,631	.....	44	..

*Compiled from figures published by C. A. Sheffield, assistant extension director, North Carolina State College.

So far, it might appear that the South ought to execute an agricultural about-face such as has been accomplished in Colquitt County, Ga., in the past few years. In *The Saturday Evening Post* for Sept. 12, 1931, Harold Tyler wrote about the change that has occurred in that county in his article "Every Farmer Prosperous." We are informed that his article was prepared in December, 1930—long before the existing low prices were reached. The article deserves careful study, however, for it depicts the terrific struggle which was necessary to accomplish the results attained.

Although the Southern agricultural leaders, and everyone else who studies the problem, know that the change must inevitably come, there are also many who are most pessimistic about it. "On the whole," writes a personal friend, "the South must completely change its whole social point of view before we can expect any far-reaching changes in agriculture in this part of the country. In industry there is a different story. Seventy-five per cent of the tenant farmers are colored families with practically no education, resources, or ambition. . . . Diversified farming is limited to a few outstanding areas of limited size and, even in them, to a comparatively few individual farmers."

Referring to Henry Ford's alleged "No garden, no job" edict, a mercantile executive in Georgia writes: "That the farming class in the South will resort to gardens to produce their needs is somewhat true, but not to the extent that one might think. I believe that that condition is coming in the course of a few years, but do not believe it will be realized to any great degree during the present depression. . . . *It is my thought that the people of the South will do without the majority of these food products rather than attempt to raise them in a great majority of cases.*" (The italics are ours.)

A poultry experiment plant is being started by Swift & Co. at West Point, Miss.—a plant to be one of the largest in the world (FOOD INDUSTRIES, page 410, September, 1931.) The Borden Co. has started an experimental plant at Newberry, S. C.

It is perfectly obvious that if Swift & Co. wanted only more poultry and eggs it probably would have gone into the well-established territories where Swift now owns going concerns; or if Borden wanted only milk it would not find it necessary to go south to new territory. To be sure, both of the plants are experiments, but these moves have a considerable significance.

When other food manufacturers discern how the new trend is affecting their affairs, they would do well to have plans ready for modest Southern plants to aid in recapturing any markets lost in this manner.

As it appears from the Northern point of view, something is bound to happen to Southern food purchases. Whether the South grows its own or does without, the effect of it will be a diminished Southern demand and, as long as the South lacks food-processing establishments to an amazing degree, as shown in the accompanying map, it is likely that the first moves of real importance will be to establish them, just as was done a few years ago when the first local meat packing house was established at Moultrie, Colquitt County, Ga.

With the organization of the Southeastern Council in October, 1931, it may be reasonably expected that the economic forces now at work will be greatly augmented by the conviction of crystallized public opinion backed up by one of the most potent forces of all: the bankers. When the latter are finally convinced that they will make more money by basing their loans on diversified agriculture, rather than on cash-crop agriculture, they will exercise their compelling influence.

Map showing where food is manufactured. Shaded areas are counties, those shown black having one-quarter of all United States food plants; next lightest shading, another quarter; lightest shading, the third quarter; and remaining quarter scattered over entire unshaded area. Note scarcity of food factories in all Southern states except Florida

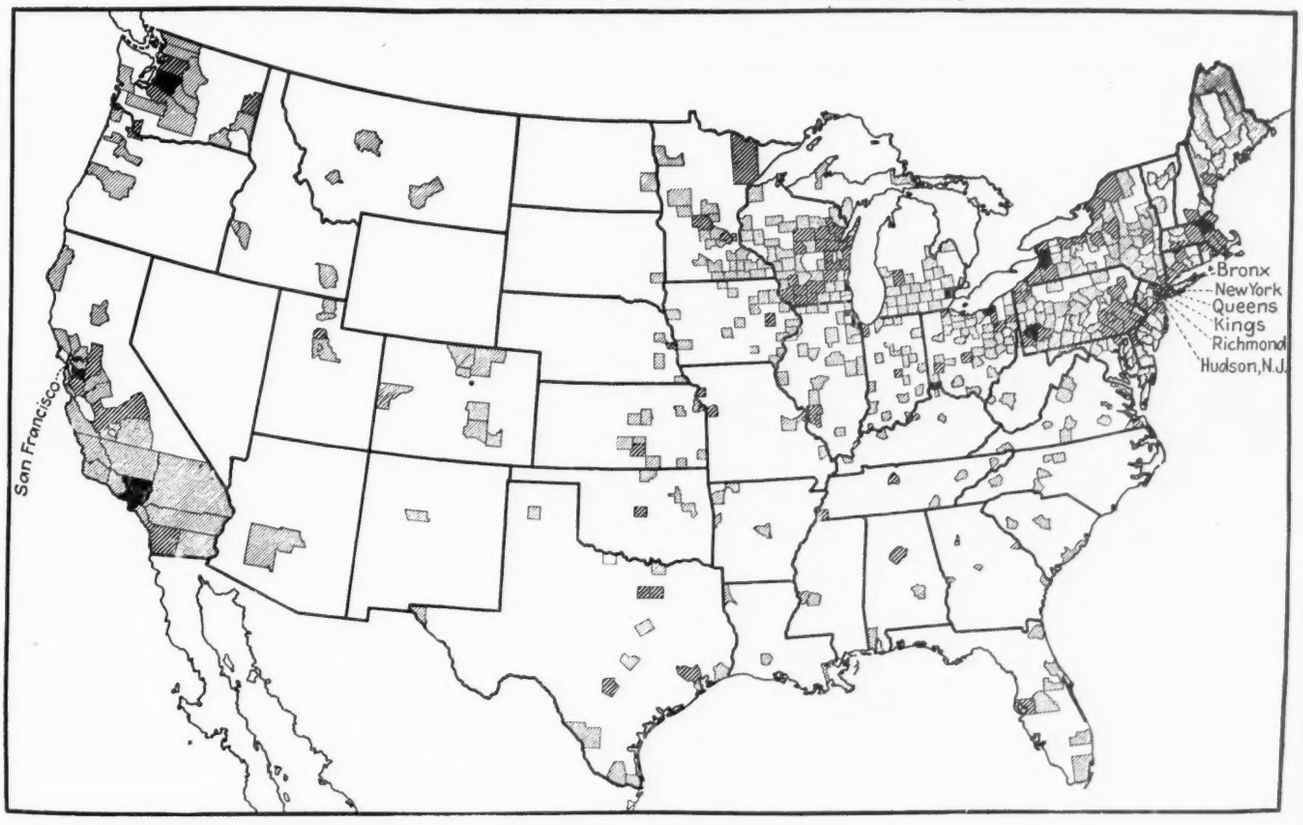


Fig. 1—Harvesting cranberries on Cape Cod

Manufacturing Cranberry Sauce

By MARCUS L. URANN
President, Cranberry Canners, Inc.
South Hanson, Mass.

ALTHOUGH universally known as cranberry sauce, this dish so well known to the American dinner table is more properly described as cranberry jelly, but it differs from the usual jellies by possession of a more perceptible texture and tartness. Manufacturing operations, however, are quite similar to those employed in jelly manufacture, with the exception that the familiar hydraulic or screw presses of the usual jelly plant are absent from the cranberry sauce plant.

For profitable operation of the cranberry sauce business, there is an indissoluble tie-up of manufacturing operations, agriculture, and control of the sale of raw materials. The first consideration, therefore, is a sound economic concept of the business. Cranberries are salable either as a raw material or as a manufactured product, and because the raw material is a perishable of rather long keeping qualities, its immediate manufacture in order to preserve it is not at all imperative. Therefore, manufacturing operations should be conducted on a plan that nets the greatest return for the raw material, whether as raw or finished goods.

Indeed, the economics of few operations in the food field are so tied up with control of raw material as the manufacture of cranberry sauce, the nearest approach probably being found in the production and canning of mushrooms. Technological reasons that govern the operation of the more successful pea and corn canning establishments of the Middle West, such as the need of complete control of raw-material production in order to insure proper quality of finished goods, are secondary to the economic problem of the cranberry industry.

Commercial production of cranberry sauce began on Cape Cod, shortly after the World War, where a number of concerns started. By 1928 all but two had disappeared and only the Ocean Spray Preserving Co., with large plants at South Hanson and Onset, Mass., and the Makepeace Preserving Co., with a large plant at Wareham, Mass., remained. Their survival was due in a large measure to control of raw material, enabling them to get the most from the crop, plus ample capital.

The Ocean Spray brand was attaining such trade and consumer acceptance, by virtue of the popularity of the manufactured sauce backed by consumer advertising, that a merger of the two companies on Cape Cod, and of Enoch F. Bills Co. at New Egypt, N. J., was effected in 1930 to put the entire output of all of these plants under the advertised brand. The consolidated companies are operated as Cranberry Canners, Inc., with headquarters at South Hanson, Mass.

Cranberry Canners, Inc., is made up entirely of cranberry growers. This has the effect of largely overcoming the chief difficulty of the cranberry canner: fluctuating prices due to market conditions. Formerly there could be no stability of operation over a term of years, because the canner never knew at what price he could sell his product, the price having ranged from $60 to $700 per ton. Now there is a contract, extending over a period of years, to supply the canning factories with berries at a fixed price. This provides the nucleus of a pack each year and permits the use of well-defined sales and advertising campaigns. It helps to stabilize operation for the grower, canner, and distributor.

Cranberries are grown in bogs in a few places in the world, the most important of which is Cape Cod. A cranberry bog costs about $1,500 per acre to bring into bearing, but after this its productive life is almost indefinite. The first cranberry bog in the Cape Cod district, laid out in 1848, is still in bearing at a profit.

As is frequently the case where products are sold either raw or manufactured, the material sold raw is harvested a little earlier than that sold for manufacturing purposes and therefore the latter usually has a slightly better quality than the former. This is true in the case of cranberries. By holding them on the vines for canning purposes there is a gain in flavor and mellowness plus an increase in sugar amounting to one or one and a half per cent, giving a total sugar content of the vine-ripened berry of between 4.3 and 4.6 per cent.

Another interesting point concerning the late picking of cranberries is their increase in size through keeping them on the vine until the last minute. An experimental test conducted a few years ago showed that the average increase in berry size was $\frac{1}{16}$-in. Calculated for the entire crop of Cape Cod cranberries this would in-

Fig. 2—The method of construction is evident in this newly laid out cranberry bog

crease its ordinary market value by very nearly $900,000.

Two methods of manufacture of cranberry sauce are employed in this country. Both are utilized commercially with considerable success, although each has its ardent supporters. They differ only in certain details which are best shown by the flow sheets, Figs. 5 and 6.

The usual method, which is the one we employ, designated here as Method A, is that of boiling the berries in water, then pulping, cooking with sugar, and canning. Method B differs chiefly in only two respects. In the second method the berries are ground in a food chopper and cooked in less water than employed in Method A. Its next difference is found in the use of vacuum pans for boiling rather than the use of open kettles.

Cleaning the raw material is the first step in manufacturing operations, regardless of which method is followed. At one plant where only a part of the cranberries, as received, goes to manufacturing operations and the rest is sold as raw material, the operation of cleaning consists of two successive passages through Hayden separators followed by a passage over picking tables. The cleaned berries are then put into storage in wooden shipping boxes, either for sale or for subsequent manufacture. This cleaning operation, which is conducted on dry berries, is to remove leaves, sticks, stones, defective berries, and any trash accidentally brought in from the bogs.

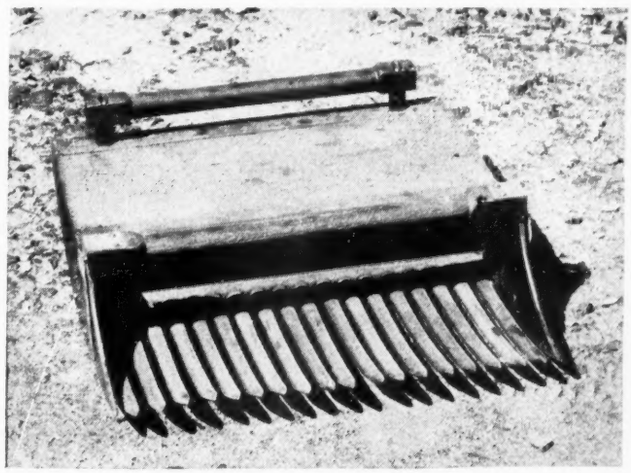


Fig. 3—This combination of rake and scoop is used to pick cranberries from the vine

Naturally, it would be unwise to wet the fruit unless it is to be utilized immediately, lest spoilage take place. Therefore, any washing operations are reserved until the fruit is to go into process, when it is then dumped from boxes into water and elevated through water sprays to temporary storage bins located above the cooking kettles. Five barrels of cranberries, weighing 100 lb. each, are put into a 300-gal. aluminum steam-jacketed kettle, sufficient water to cover is added, and they are then boiled until the fruit becomes sufficiently soft to remove the skins and seeds by passage through a pulping machine.

The pulping machine, constructed of Monel metal, is the familiar machine used in the tomato products industry for crushing the fruit and expressing the juice from it by rubbing it through a cylindrical sieve. The pomace is discarded and the juice is run into another set of kettles in measured quantities. The size of the batch of juice is regulated to be exactly the right amount to add to sugar from an even number of bags weighing 100 lb. each. This avoids the complication of weighing the sugar. Boiling is continued until its appearance of sheeting off from a skimmer (a method very familiar to all

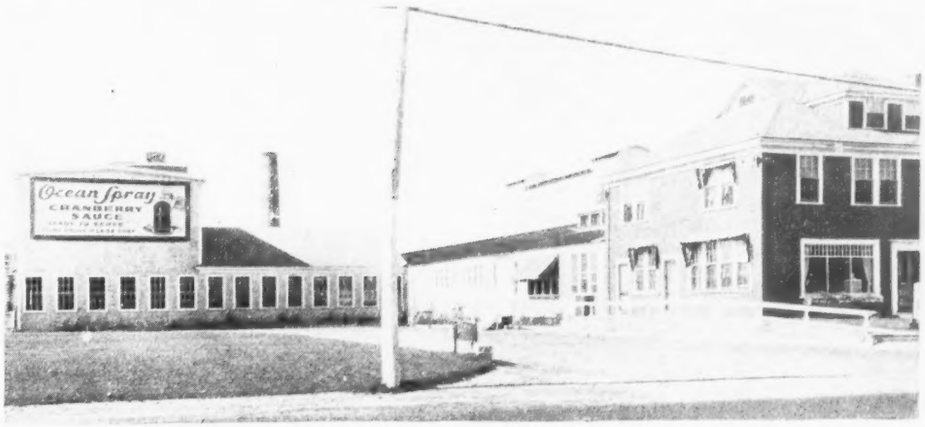


Fig. 4—One of the Cape Cod canneries where cranberry sauce is manufactured

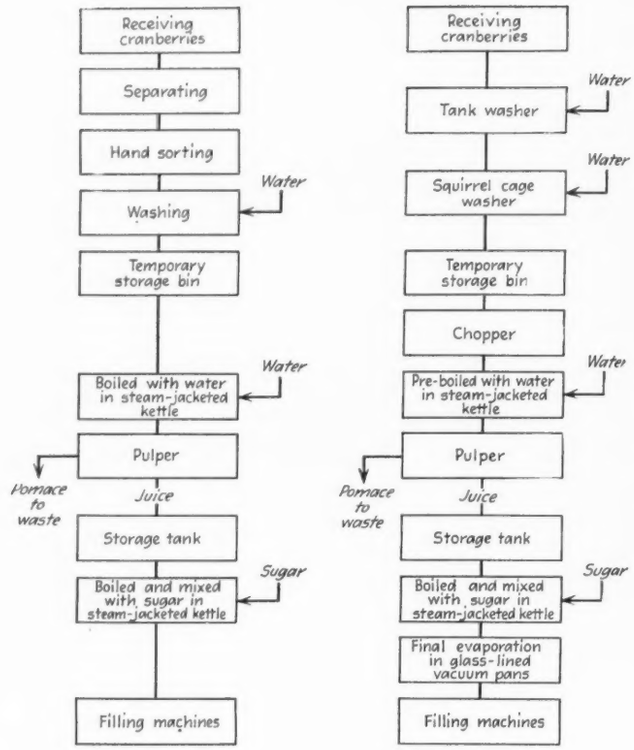


Fig. 5—Flow sheet for manufacture of cranberry sauce by Method A

Fig. 6—Flow sheet for manufacture of cranberry sauce by Method B

jelly cooks) indicates that it is sufficiently concentrated. The finishing point is about 216 deg. F.

The cranberry sauce is now complete and is ready for filling. A piston type of filling machine made by the Progressive Engineering Co. is used for filling glass jars and a Hansen rotary-type filler for cans.

Fig. 7—In Method A, cranberries are elevated by this draining conveyor from the washing tank to a temporary overhead storage. Kettles for preboiling washed cranberries are shown at left

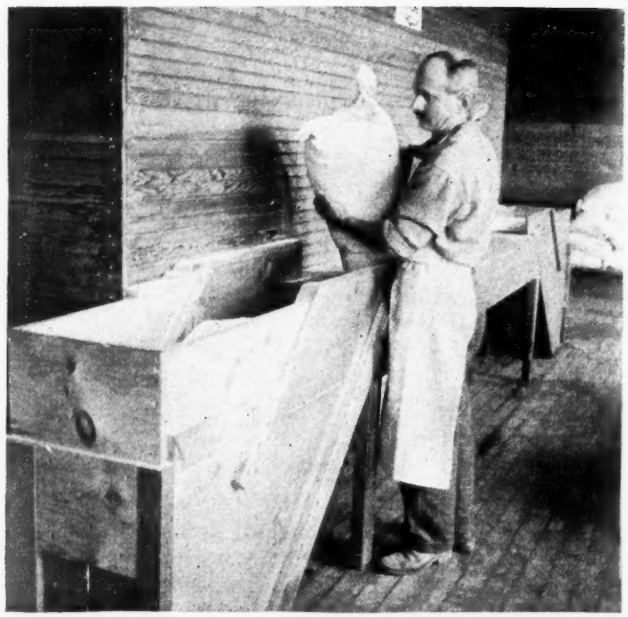
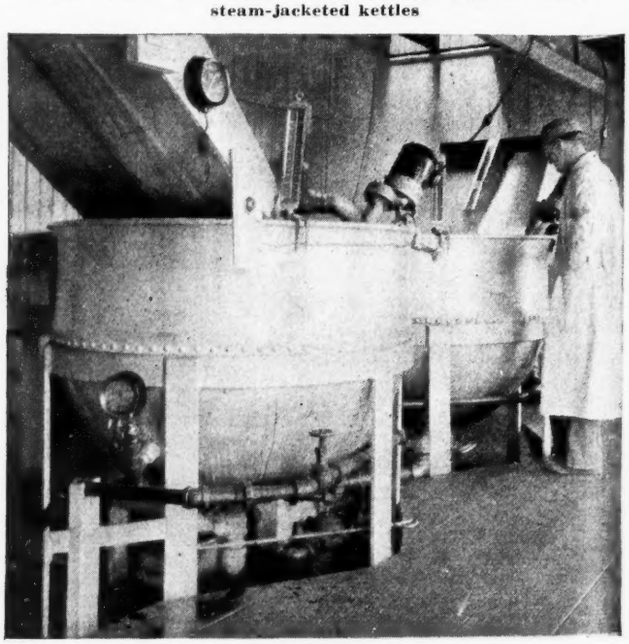


Fig. 8—Sugar, emptied from bags into these hoppers, is fed into the kettles below, where it is mixed and cooked with cranberry juice—Method A

Because of its high acidity, cranberry sauce is so easily sterilized that the heat contained in hot sauce is sufficient for complete sterilization and therefore no processing for this purpose is required beyond the cooking operation.

The plant formerly employing Method B for the manufacture of cranberry sauce concentrated entirely on the manufacturing operation and did not attempt to prepare berries for selling as raw material. Therefore, separating and dry picking operations were accomplished by the growers. Berries were received and weighed as usual and dumped into water, which gave them the preliminary washing operation and also floated away the berries from any heavier materials. They were next lifted by a

Fig. 9—After the cranberries leave the kettles shown in Fig. 7, they pass through a pulper, the pomace is discarded, and the juice is mixed with sugar in these steam-jacketed kettles



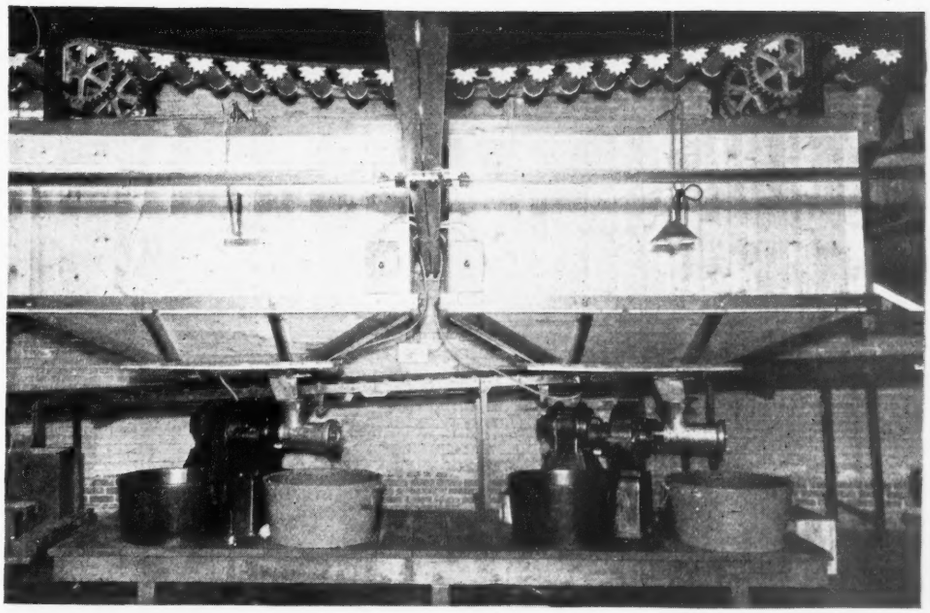


Fig. 11—Washed and cleaned cranberries are delivered by the conveyor at the top to the bins, whence they pass to the choppers shown at the bottom—Method B

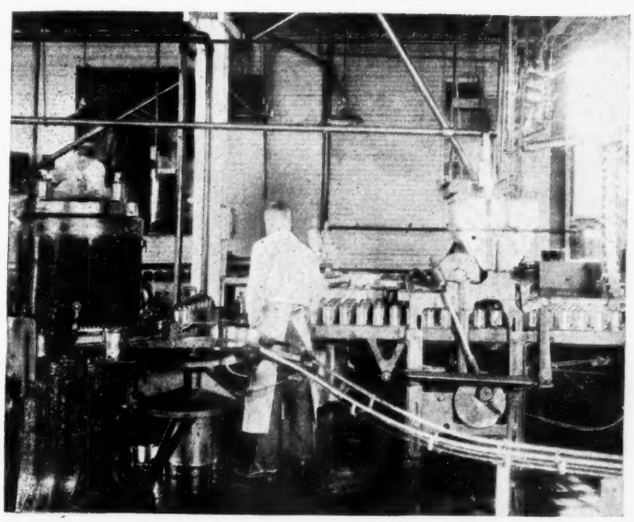


Fig. 10—The finished sauce from the kettles shown in Fig. 9 is filled into cans and glasses by the equipment here shown

skimming conveyor to a squirrel-cage washer and given a spray of water, which washed out the trash and stems from the berries, whence they passed to an elevating conveyor that took them to hoppers on an upper floor in the plant.

Since in this method less water was added to the berries for cooking purposes, it was necessary to chop the berries in order to get enough liquid to permit them to be boiled. The chopping was done in the familiar Hobart food chopper shown in Fig. 11. The chopped berries, gathered in receptacles shown in the illustration, after weighing were transferred to the precook kettles shown in Fig. 12 on the right-hand side. These were aluminum, steam-jacketed kettles of a type exactly like those used in Method A. The object of the precooking was to free the pectin and cook the berries sufficiently soft to put them through a pulping machine in order to strain out the skins and seeds. In this plant the pulping machine shown in Fig. 13 was equipped with the fine screen that is used on the usual finishing machine.

Strained juice was pumped hot by a Tri-Clover centrifugal pump through aluminum piping to another alumi-

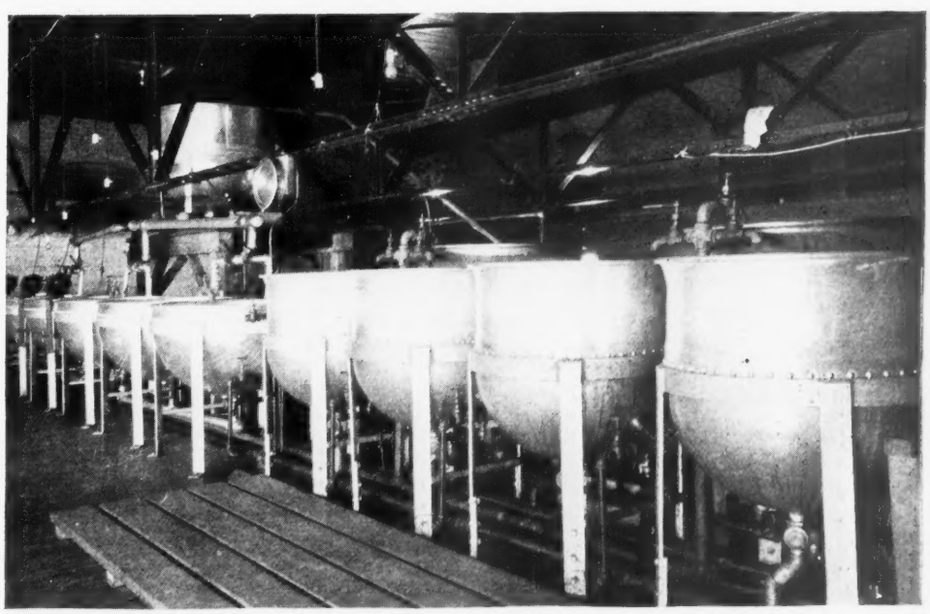


Fig. 12—Chopped cranberries are precooked in the kettles in the foreground. After pulping, the juice passes to the storage kettle above, whence it is fed to the mixing kettles at the rear, where sugar is added—Method B

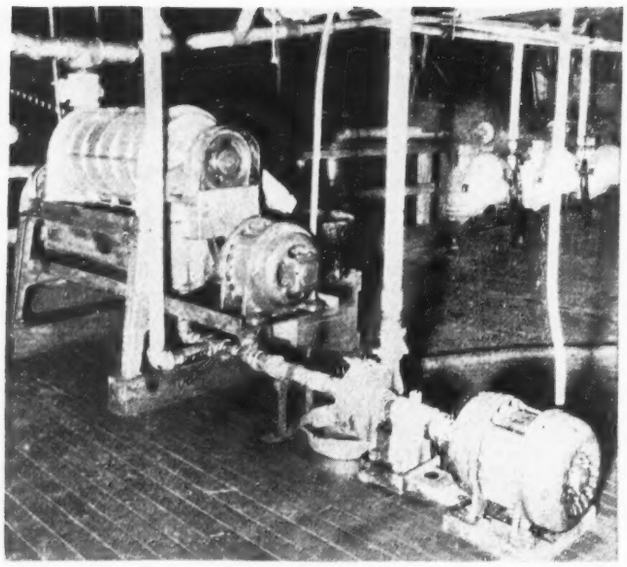
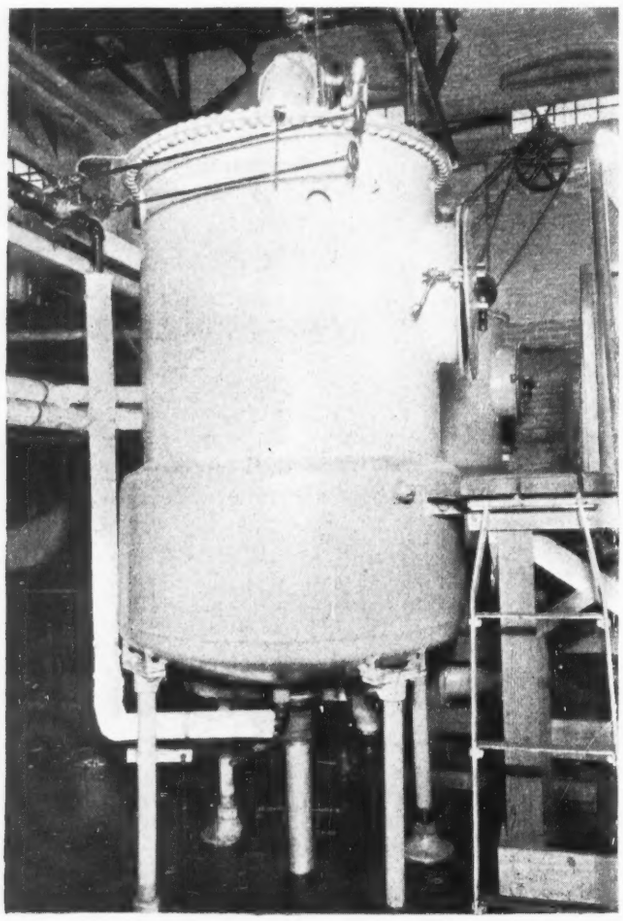


Fig. 13—After precooking, the chopped cranberries are pulped in this machine and the pomace is separated out for disposal—Method B

num kettle, shown in the upper part of Fig. 12, which served as a reservoir. From the reservoir the juice flowed to mixing kettles, shown on the extreme left end of Fig. 12, where the sugar was added and mixed in by means of Alsop mixers. Only enough steam was used in these operations to keep the juice sufficiently hot to facilitate melting the sugar. All evaporation was performed in Pfaudler glass-lined vacum pans, two of which are shown in Fig. 14.

Fig. 14—Final cooking of the cranberry sauce is carried out in these two glass-lined vacuum pans—Method B



Determination of the finishing point was made by a Bausch & Lomb refractometer, as shown on the cover of this number of FOOD INDUSTRIES. When the proper end point had been determined by the refractometer, the cranberry sauce flowed into what is termed a balancing tank, which is merely a surge point in the equipment to permit continuous operation of the previous equipment whenever any subsequent difficulties occurred.

From this point on, the sauce was filled into enameled tin cans and then run through a continuous cooler, just as is done in the Method A. In order to facilitate continuous operation, a drying system was installed whereby the cans were conveyed through a blast of hot air furnished by the blower, the ducts from which are shown in Fig. 15, which brought them out dry and ready for labeling or casing.

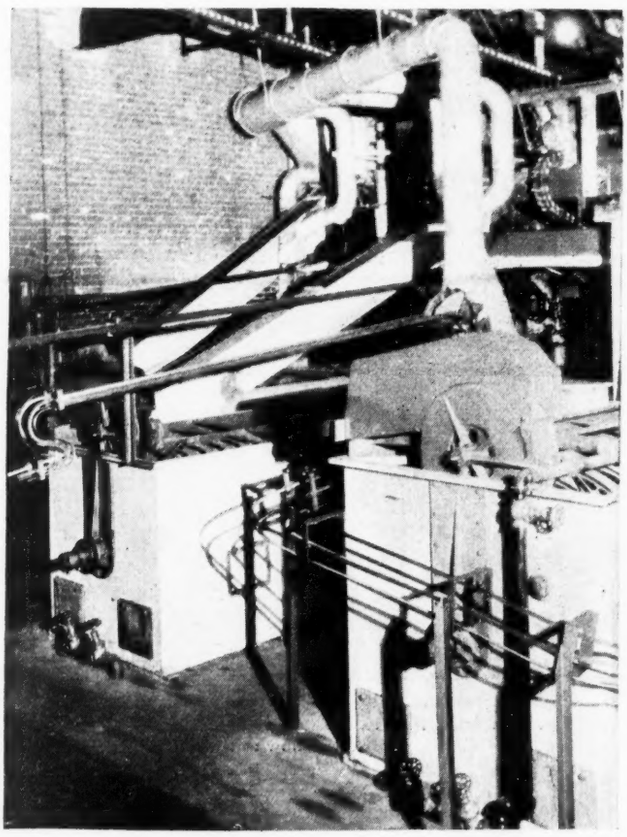


Fig. 15—Continuous operation is made possible by a system of drying the cans emerging from the cooler. The air ducts from the fans to the coolers appear in this view—Method B

The evaporation of the sauce in the vacuum pan was effected at a temperature of about 140 deg. F. and at the end point the vacuum was broken and the contents brought to sterilizing temperature.

Piping used for conveying cranberry sauce is either Monel, nickel, or aluminum pipe, for it presents an abnormal problem of corrosion on the other common metals that have been tested up to date.

An average yield of ten cases of 24 tall cans of the canned cranberry sauce is obtained per barrel of cranberries. Labor cost for all sizes of containers at one plant averaged 10½c. per case in 1929. In our plants, employing the A method, the entire time required to go through the process is only 21 minutes.

Good Drinking Water Pays Dividends

By R. R. HOWARD
National Safety Council
Chicago, Ill.

The water jets at an angle from a protected orifice in this approved type of fountain

Courtesy Ford Motor Co.

DURING the past 10 or 15 years we have been gradually taking a new view of the value of good drinking water for the industrial plant. Formerly, the average factory manager thought of drinking water mostly from the viewpoint of a "convenience" which he owed to his workers. The progressive manager now knows that his factory supply of drinking water may have an important effect on the health of his workers. Their health, of course, will affect absenteeism, which may be costly to him in changing personnel, labor turnover, extra supervision, and lessened plant efficiency. He also knows that a lack of good drinking water, especially during hot weather, may affect the comfort of his workers; and that fatigue is closely related to efficiency and the liability to accidents. Medical authorities agree that persons should have from seven to ten or more glasses of water daily, depending, of course, on the weight of the body, its activity, and the temperature of the air.

To obtain a plentiful supply of good drinking water for all employees is a problem for the plant sanitary engineer. His first question, naturally, will relate to the source of such a supply. His problem is simplified, of course, when the plant is located in a community where there is a plentiful supply of city or district water, the purity of which is supervised by public officials.

But even in such localities some industrial plants have found it advantageous to obtain drinking water from other sources. For example, a group of ten industrial plants in an Ohio city cooperated to develop a single large artesian well which supplies them with cool and pure water. A central power station was developed to force the water to the drinking fountains of the entire factory colony at a temperature of about 50 deg. The water is regularly tested for bacteriological contents and no cooling is needed before the water is delivered to the fountain.

"This system," said an official of one of the plants, "has proved very successful and has encouraged the men to drink considerable quantities of water, which undoubtedly has a beneficial influence on their health."

Even where there is an available supply of regularly tested city or district water there often is a tendency, especially during the warm summer months, to use some substitute water supply from a local well or a spring, because such water may be cooler or more palatable. Such tendencies should be closely watched. The best way to combat the habit among workers of drinking water from miscellaneous sources is to provide at convenient places in the plant drinking fountains with a plentiful supply of cool and wholesome water.

In addition to the usual restriction by law regarding the purity of drinking water, some state industrial commissions and state supreme courts have made rulings to the effect that illness and death from a contaminated plant water supply is, within the meaning of the Workmen's Compensation act, an accident. If the plant laboratory is not equipped regularly to test the purity of water, such tests usually can be obtained without cost from city or state health departments.

When a pure supply of water is insured, the next problem is the most effective circulation of the water supply. Many large and even medium-sized plants now favor the use of a water system which includes thorough filtration, refrigeration, and continuous circulation throughout the plant to conveniently located drinking fountains.

This method guards against the placing of fountains at the end of the pipes with standing water which must be drained off before a cool supply of water may be obtained. When each fountain is on a continuous loop of circulating water, the water is immediately fresh and cool, and there is considerable saving in water otherwise wasted. It also makes possible cooling of water to the exact desired degree and guards against excessively cold water, which is common when ice coolers are used. It also eliminates the necessity of placing individual coolers throughout the plant. Many companies now having such refrigerating systems in operation find the service satisfactory, with a considerable saving in cost, as compared to other methods of supply with equal distribution.

In many smaller plants, individual electric cooling units have been found satisfactory. Even where there is an available supply of city or otherwise certified water, it has been considered advisable by many companies to use an additional water purification plan. Where a filtration method is used, this system should be kept in good condition, for otherwise it will lead to a false sense of security. In extreme cases, it has been found necessary to boil the drinking water or to distill it. Five minutes of boiling usually will destroy any known waterborne disease germ. The disagreeable taste of some water after boiling generally may be remedied by bubbling air through the water, since a lack of air in the solution is the most frequent cause of the flat taste of the water.

The kind of water supply system which is most economical in a manufacturing plant will depend on a number of conditions. These will include the type of build-

ing, the facilities for piping, the number of persons to be served, the quantity of water desired, and the relative location of the individual drinking fountains.

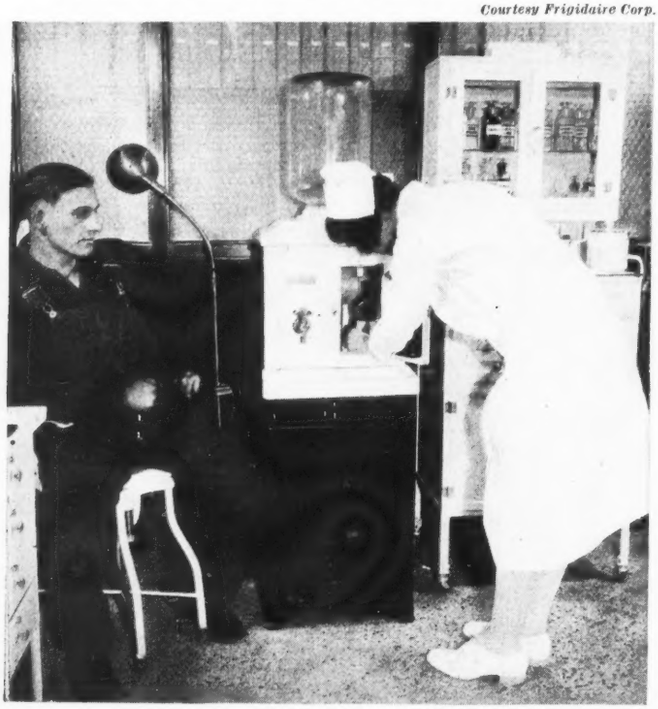
The chief objection to a circulation system where the water is not refrigerated is that the water usually is not cool enough during periods of hot weather; and it may not be cool enough at other times when the pipes, unless properly insulated, come through a heated portion of the building. It is the custom in some plants, in an attempt to keep the supply of drinking water suitably cool, to permit the drinking water to run continuously from the faucets. Of course, this practice leads to a great waste of water, and often to unsuspected costs. As one example, a check on the water meter of a manufacturing plant where three faucets were left running during the summer hot weather proved that the water thus wasted was costing the plant not less than $45 a month.

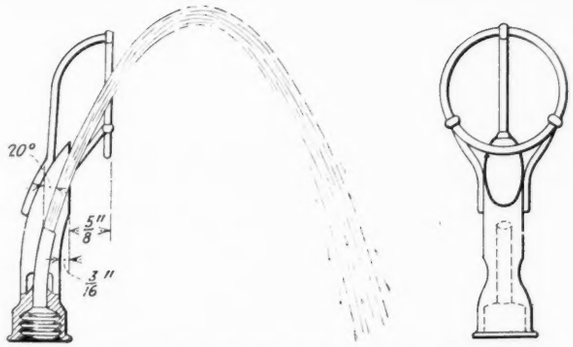
This suggests the question of what is the best temperature for drinking water. Health authorities agree that the water should not be too cold, and this is the chief objection to water cooled by ice. If the water is too cold, the worker either will drink too slowly and thus waste considerable time, or will not drink enough for the needs of health and working comfort. If ice is used for cooling, therefore, it should not come in direct contact with the water which it cools.

One of the first investigations known to have been made relative to the best temperature for drinking water and the proper amount of water per person was made some years ago by Dr. Watson, of Cincinnati. First, he observed that the average person wasted fully as much water as he drank, even when the water was at the most favorable temperature for drinking. Also some persons and some groups were much more wasteful than others, and a person in very active work or when continuously exposed to high temperatures naturally drank extreme quantities of water. It is natural, too, when the water is not properly cooled for drinking that there will be increased waste.

This mechanically refrigerated cooler unit with storage compartment has advantages for the plant first-aid room

Courtesy Frigidaire Corp.





General construction of sanitary jet for drinking fountains, showing the guarded discharge pipe

Following is a part of Dr. Watson's tabulations, showing the total quantity of water to be refrigerated, both used and wasted:

Class of user	Proper Temp. of cooled water	Amount of water used and wasted
1. Office building		
Employees	50 deg. F.	1 gal. per day per person
Transients		1 gal. per each 250 transients per day
2. Light manufacturing	50 to 55 deg. F.	1½ gal. per day per person
3. Heavy manufacturing	50 to 55 deg. F.	2 gal. per day per person
4. Restaurant table service	45 to 50 deg. F.	1 gal. per each 10 persons served
5. Cafeteria service	45 to 50 deg. F.	1 gal. per each 12 persons served

The several possible types of refrigeration have both advantages and disadvantages, depending on conditions of use. The individual cooler has the advantage of being a complete refrigerating unit and drinking fountain, and the entire cooler is more or less portable. Thus there will be no thermal losses because of piping, and the water may be regulated to the exact desired temperature. The objections are higher original costs and the considerable amount of floor space required for such units. Under ordinary conditions, there will be a considerable saving over a 10-year period in the use of a mechanically refrigerated unit compared to an iced unit. A circulating refrigeration system is best adapted to a building with multiple stories or to a small manufacturing plant. The circulating pipe should be well insulated and the pipe large enough to lessen frictional resistance. When such a system is properly planned and constructed, engineers state that the circulating water should not lose more than 5 deg. F. between the fountain and source of refrigeration.

State laws regulating the use of drinking water and prohibiting the common drinking cup have stimulated the use of drinking fountains. But it is still true that many of the drinking fountains in common use are not as sanitary as they should be. Investigations made by several state universities to determine what types of drinking fountains were most sanitary led to revelations which were quite enlightening. It was found, for instance, with fountains having slight water pressure, where the water fell back into the pipe from which it was discharged, and where it was possible for the water jet to be covered by the lips of the drinker, that impurities might remain bubbling up and down in the water jet for many hours. The best type of fountain the finding showed, was the one which discharged the water at an angle instead of vertically.

The entire problem of drinking water supplies for a manufacturing plant is well summarized in the final report recently made by the joint committee on plumbing of the Public Health Engineering Section of the Ameri-

can Public Health Association and the Conference of State Sanitary Engineers in October, 1930, as published in the U. S. Department of Labor Bulletin No. 87 on "Sanitary Drinking Facilities With Special Reference to Drinking Fountains."

Here are the recommendations of the committee:

Source of Water—Should be absolutely pure. Consult local health department. Water not suitable for drinking should be so marked. Should not be in containers except where local supply is impure and bottled water is used.

Sanitary Service—Either *A* or *B*, as follows:

A. Bubbling fountains meeting these standards:

1. Fountain shall be of impervious material, as vitreous china, porcelain, enameled cast iron, other metals, or stoneware.

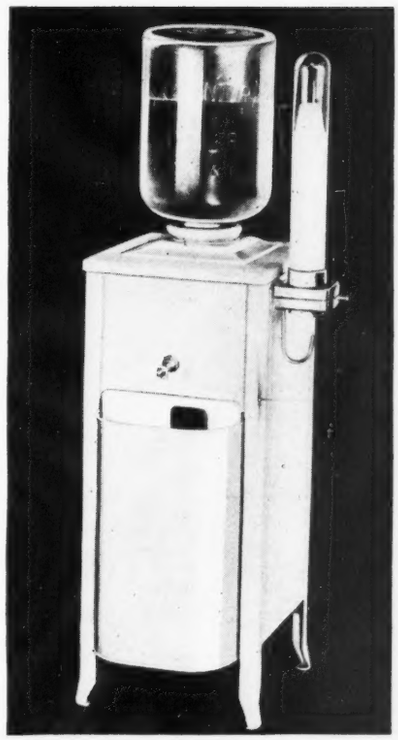
2. Jet shall issue from nozzle of non-oxidizing, impervious material set at an angle from the vertical. Nozzle and every opening in pipe or conductor leading to nozzle shall be above edge of bowl, so that nozzle or opening will not be flooded if drain from bowl becomes clogged. (Note—it is understood that the angle be such that the water can neither fall back nor be forced back onto the point of discharge.)

3. Nozzle shall be protected by non-oxidizing guards to prevent drinker from coming in contact with nozzle.

4. Jet of water shall not touch guard.

5. Bowl of fountain shall be free from corners difficult to clean or collecting dirt.

6. Bowl shall be so proportioned as to prevent unnecessary splashing.



With sanitary cups attached to the cooler, the easiest way is the sanitary way

7. Drain from fountain shall not have direct physical connection to waste pipe unless trapped.

8. Water supply pipe shall have adjustable valve fitted with loose key or automatic valve permitting regulation of rate of flow of water to fountain, so that valve manipulated by drinker will merely turn water on and off.

9. Height at drinking level shall be convenient to most persons using fountain.

10. Waste opening and pipe shall be large enough to carry off water. Opening shall have strainer.

B. Individual paper cups furnished free by employer.

Proper Use—Hands, mouth, or face should not touch any part of faucet, bubbler head, or guards of fountains. Individual paper cups should be protected from dirt, supply should be adequate, and means of disposal provided.

Location—Should be convenient, well lighted, clean.

Temperature—Water should be cool but not iced. If ice is used for cooling, it should not come in direct contact with the water.

Maintenance—Facilities should have frequent cleaning and disinfecting; also repair and adjustment as necessary.

Experiments prove that a plentiful supply of good drinking water is a good investment in a manufacturing establishment. When the fountains are conveniently located and when the water is released at the proper temperature, purified and palatable, the workers are encouraged to drink more often. This is an undoubted health benefit, and will add to individual efficiency and to the general good will of the plant.

▼ ▼ ▼

An Unemployment Plan That Works

INDUSTRY has an obligation to tide its stable group of employees over extended periods of depressed business. So thinks James W. Hook, president of the Geometric Tool Co., New Haven, Conn. It is not just another generality with him, however, for a plan recognizing this obligation, and fulfilling it, has been in operation in his plant since the depression began. He describes it in the October issue of *Mechanical Engineering.*

A threefold study makes the plan possible: First, keeping of records to help spread work intelligently when the factory is running short time. Second, determination of just who are the stable workers. Third, collection of actuarial data that will show, when this depression is over, what reserves must be set up to tide stable workers over the next, if and when it comes.

Twenty-five per cent of the unemployed, Mr. Hook estimates, are unemployable. These are a problem for society as a whole, not for industry alone. Thirty-five per cent are the unstable, or nomadic, workers. It is they who are most benefited by municipal appropriations, bond issues, and public construction work. Forty per cent of the unemployed are stable workers—loyal men and women settled in their habits, who are raising families and building homes. These are essential to the success of industry in normal times. To them industry now has a difinite obligation.

How great would employment reserves for this group have to be? Mr. Hook's organization has calculated the amount necessary to maintain the wages of the stable group in office and shop at 80 per cent of normal for those with dependents and 60 per cent for those without, for 52 weeks of short-time work.

It amounts to but three-quarters of one per cent of the payroll for the years 1923-1929! Reserves equivalent to 13½ per cent of the same group of payrolls had been set up for other purposes in this period.

Perhaps the problem would be more complex in other industries, in highly seasonal fields, or in the face of cut-throat competition. This Mr. Hook admits. But with social legislation an alternative constantly more imminent, he contends, it certainly ought to be tried.

Dehydration Costs For Fruits and Nuts

By A. W. CHRISTIE
Field Manager
California Walnut Growers Association
Los Angeles, Calif.

The "cheapest" source of heat for dehydration means nothing unless the thermal requirements and selling price of the product, as well as the conditions under which the source of heat is available, are taken into account. Even free California sunshine may be less economical than gas, oil, or electricity. This cost study of oil versus electricity for drying prunes and walnuts shows the principles by which a question of this kind can be answered.

PRODUCTION of dried fruits and nuts represents one of the largest horticultural industries of California. The present normal production approximates 600,000 tons (dry weight) and returns to producers nearly $100,000,000 annually. Prior to the World War, all dried fruits and nuts were produced by sun-drying, except apples, which, being produced late in the fall in cool, humid regions, were always artificially dried. During the past ten years, however, there has been a steady increase in the use of dehydrators employing artificial heat for drying a number of products formerly sun-dried, particularly prunes, raisins, and walnuts.

The main factors in the development of newer dehydration methods have been:

1. The requirements of the World War for concentrated foods, resulting in a considerable production of dehydrated vegetables, interest in which persisted for many years thereafter.
2. Heavy losses suffered by California growers of prunes and raisins, due to heavy, early fall rains, especially in 1918, which created a demand for a reliable, inexpensive substitute for sun-drying as crop insurance.
3. Investigations and publications of federal and state experts, engineers, and manufacturers, which brought about clearer understanding of the fundamentals of economic dehydration and revealed that the home-made "rain damage" dehydrators which a few growers had been attempting to use were considerably less efficient than the commercially built equipment.

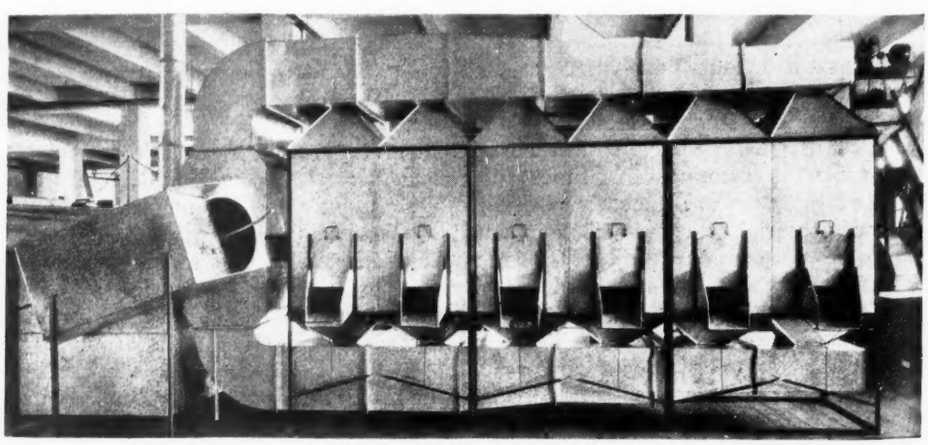
About 1,000 modern air-blast dehydrators are now in use in California, most of them built in the past ten years. Nearly half of these are used on walnuts and the remainder mostly on prunes, with a few on raisins and apples. The present increase is at the rate of 50 to 100 per year, depending on the volume of the annual crop of each of these products and the financial condition of the growers. The present commercial types for the products mentioned yield a dried product equal to or superior to the sun-dried product and at little or no greater cost, not to mention the far greater speed and safety.

Dehydration, as contrasted with merely "drying," may be defined as the evaporation of excess moisture from a product in a current of air, the temperature, humidity, and flow of which are under regulation. The essential requirements are:

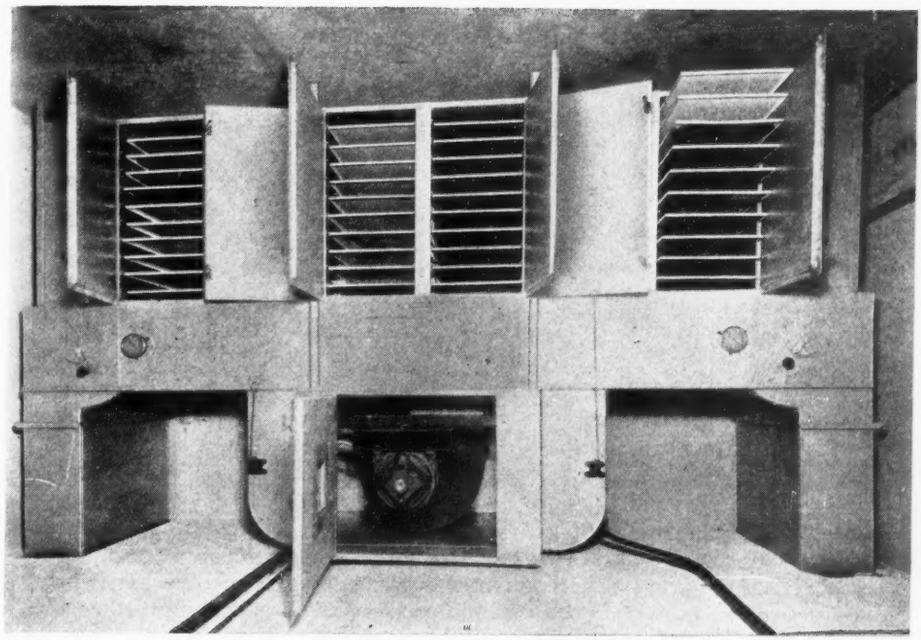
1. Production of heat for rapid evaporation of excess water.
2. Production of power to operate fans, burners, and accessory equipment for preparing or handling the product.
3. Economical use of heat, power, and labor with respect to direct operating costs and fixed charges on investment.

Most dried products are low priced; the difference between cost of production and sale price usually is so narrow that only the most economical drying process can be profitably employed. Furthermore, since dehydrators are in use only one or two months in the year, the investment must be kept low, even at the expense of operating efficiency, or else the fixed charges per pound become unreasonable. In short, unless dehydration can be accomplished at little or no greater expense than sun-drying, growers will not adopt the new method, despite its demonstrated advantages.

The efficiency and economy of various methods of supplying heat and power to dehydrators is obviously influenced to a large degree by the characteristics of the



Each of the six bins of this electric dehydrator can turn out 1,000 lb. of walnuts. The electric heating units are located in the box at the left. Periodic reversal of air flow insures even drying



Another form of dehydrator in which electricity is used both for power and heat

product to be treated. Electric dehydration, for instance, has been most extensively employed on walnuts, 15 per cent of the walnut dehydrators using this source of heat. For prunes, the most important fruit being dehydrated, oil heating is far more economical. A more detailed consideration of the requirements for these two products shows why this is so.

Heat Requirements for Prunes

Under the conditions of dehydration, 1,100 B.t.u. is theoretically required per pound of water evaporated. Since the average drying ratio of prunes is 2.5 to 1, one ton of fresh fruit loses 1,200 lb. of water and yields 800 lb. of dried fruit. Hence, evaporating 1,200 lb. of water at 1,100 B.t.u. per pound gives a theoretical requirement of 1,320,000 B.t.u. per ton.

Extensive tests of many excellent plants give an average over-all fuel efficiency of 45 per cent. Heat is lost by radiation or leakage from the drying chambers, by the removal of the dried fruit on trays when hot, by the continuous discharge of warm humid air and, in indirect heating systems, by stack losses. These losses are either unavoidable or not susceptible of economic reduction. Consequently, the actual heat requirement per ton is 1,320,000 ÷ 0.45, or 2,933,333 B.t.u. Assuming 142,000 B.t.u. per gal. of oil, the requirement becomes 20.65 gal. per ton, which, at 5c. per gal., equals $1.03 per ton.

With electric heating, stack losses can be eliminated and the over-all fuel efficiency raised to about 65 per cent. Taking this figure and 3,400 B.t.u. per kw.-hr., the heat requirement becomes 597 kw.-hr. per ton, which, at 1c. per kw.-hr., the lowest rate ever obtained at any dehydrator, equals $5.97 per ton. This simply means that even under the most favorable conditions the cost of electric heat for dehydrating prunes is about six times greater than for oil. Even if it were possible to attain 100 per cent fuel efficiency with electric heat, the cost would still be four times as great.

Since the entire cost of dehydrating prunes, including fixed charges, averages $8 per fresh ton, or 1c. per dry pound, it can be readily seen that the use of electric heat would nearly double the cost of drying.

The main power requirement in connection with dehydration is for the operation of large fans, usually of the centrifugal, multi-blade type. A small amount of additional power is required for burners, pumps, air compressors, dippers, graders, and conveyors.

The fan power requirement is normally 15 hp. per fresh ton capacity. Taking the average drying time of 24 hr., the power requirement becomes 36 hp.-hr., or 27 kw.-hr. per ton. However, additional power requirements bring this to an average of 32 kw.-hr., which, at the average cost of 2c., equals $0.64 per ton.

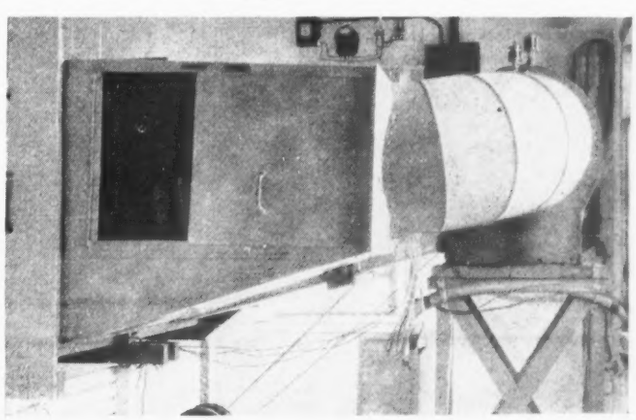
Electricity is the ideal and almost universal source of power, the only exceptions being where electricity is unavailable. A few operators have tried gas engines or tractors, but the greater cost of power finally turned them to electricity.

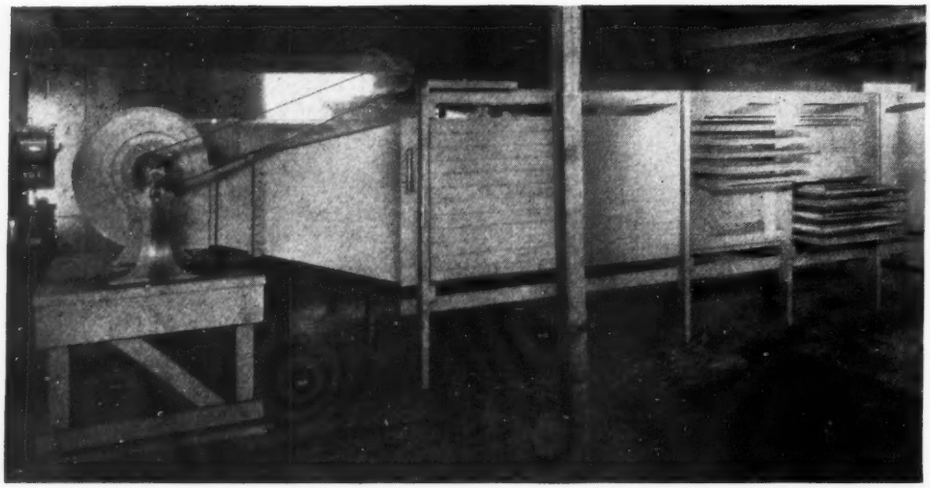
Requirements for Walnuts

Within recent years, about 60 electrically heated walnut dehydrators have been constructed in California. This represents about 15 per cent of all walnut dehydrators, the remainder being about equally divided between oil-heated and gas-heated. Electric heat has been comparatively successful in walnut dehydration, because the following factors are operative:

1. Radiation and other heat losses are minimized because of the low critical temperature of walnuts; 110 deg. F., compared with prunes, 165 deg. F.

Within the chamber is the electric heater in the air intake. This dehydrator is used on glacé fruits





A recirculating electric dehydrator used on glacé fruits

2. The naturally low moisture content of walnuts (only about 20 per cent is lost during drying) results in a low B.t.u. requirement per ton.

3. The comparatively high price per pound of walnuts enables this product to absorb a slightly increased cost of drying.

4. Walnut dehydrators operate on the intermittent or batch system, rather than on the continuous system, as with fruits. Electric heat is easily and accurately regulated by automatic thermostats in the operator's absence.

5. Certain growers already have large power installations for irrigation pumps which are not in use during the drying season and which furnish a source of electric heat by the mere use of a double-throw switch. This often reduces the average rate per kilowatt-hour and eliminates the cost of installing oil tanks, pipes, and burners.

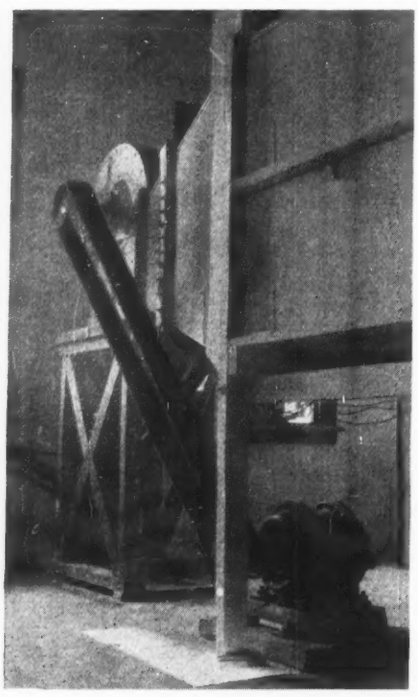
The average of many tests on walnut dehydration shows a loss of 18.4 per cent water, or 453 lb. of water per ton of dried nuts produced. This is equivalent to a theoretical requirement of about 500,000 B.t.u.

In oil-heated dehydrators, the over-all fuel efficiency was found to be 19 per cent, resulting in a requirement of 18.5 gal. per dry ton, which, at 6c. per gal., equals $1.11 per ton. In electrically heated dehydrators, the over-all heat efficiency was found to average 44 per cent, resulting in a requirement of 334 kw.-hr. per dry ton, which, at 1c. per kw.-hr., equals $3.34 per ton. In other words, the advantages of electric heat cost, on the average, but $2.23 per ton more. This is equivalent to 0.1c. per lb. of walnuts, and only about 1/200 of their farm value.

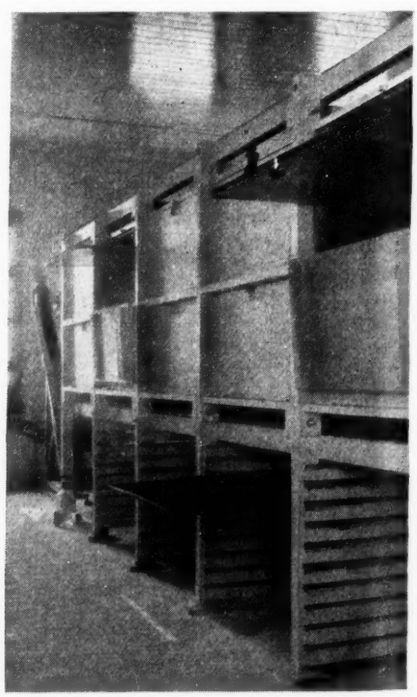
Attempts to insulate against radiation losses and thereby make electric heat more economical have failed because the cost of such insulation would require many years of the nominal savings to counterbalance it.

Power used in and around walnut dehydrators is principally to operate the fan but also for hullers, washers, and elevators. It averages 1.5 hp. per dried ton capacity. The average consumption is 24 kw.-hr., per dried ton, and this usually costs $0.50. If electricity is used for heat, also, the rate usually drops to 1c. per kw.-hr., resulting in a power cost of only about $0.25 per ton.

The claim is sometimes made that electrically dried products are superior, but since other fuels employ the indirect radiation system of air heating and the products of combustion are never absorbed by the air or the product being dried, such claims appear to be without foundation.



The "heart" of any dehydrator is the large multi-blade fan that circulates the air at the desired velocity

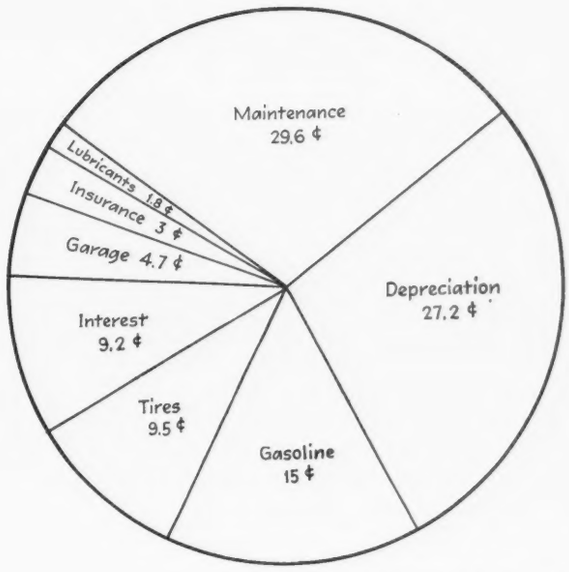


An electrically heated dehydrator used for drying fruit

Scheduled Inspections—Preventive Maintenance—Lower Trucking Costs

Suitable Equipment and Systematic Methods Save Money

By F. E. SPOONER
Maplewood, N. J.



How the trucking dollar is divided, according to a survey by Iowa State College

TO one vitally interested in the subject of truck maintenance, this important phase of delivery expense is a never-ending search for information and methods that will eliminate losses through waste.

The first waste that disturbs the head of a maintenance department is a disabled vehicle made idle either on the road or in the shop. When this happens on the road, it means that goods in transit are delayed and must be picked up by some other vehicle and that the repair department is thrown off its scheduled routine in the daily handling of trucks picked for shop inspection and necessary attention.

When trucks are involved in roadside breakdowns caused by parts failures, then the responsibility usually can be traced to some weakness in the shop inspection system or its method of repair. Sometimes, and quite frequently, such failures are traced to improper or inadequate lubrication, and then it becomes a question of placing the blame on the person to whom such work is intrusted. In other cases, failures are traced to inherent weaknesses in design of one or more chassis parts or to improper adjustments. Regardless of where the trouble lies, the main problem is not so much that of placing blame but of insuring against recurrence of the trouble.

This can be accomplished only through periodic inspection and preventive maintenance. This combination is the foundation for most well-planned maintenance systems. The day has passed when trucks are permitted to reach that stage of imperfection where they must undergo a two-week overhauling. They are now repaired "on the hoof," or under a "stitch-in-time" or "unit-replacement" system.

Keeping trucks out of the shop the maximum time is now a matter of organized inspection that catches minor troubles before they become major and preventive maintenance that foresees troubles before they occur.

Through inspections, such things as lubrication, greasing, tightness of bolts, wheel alignment, batteries, and lights are checked on a periodic or mileage schedule, depending upon route conditions and the severity of service. For example, a truck in mid-city work making many stops would get more attention to brakes and the clutch than would one operated in the open country. Where the first truck would receive weekly inspections, the other would be on a two-week basis.

Preventive maintenance would involve the flushing of radiators, attention to water hose, spark plugs, wiring, bearings, and other wearing units for the purpose of removing them before they start causing trouble.

This work is greatly simplified by a system in which a record is kept on every truck. To further simplify this work, certain duties can be handed over to the drivers, while others of a more technical nature can be assumed by the shop foreman, inspectors, or mechanics.

In all cases, printed records must be filled out, checked, and signed by those handling the inspections and maintenance.

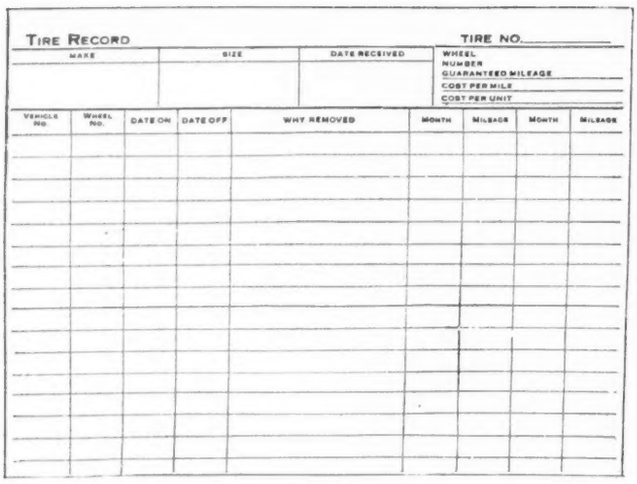
The drivers usually are held responsible for checking water in the radiators and battery, tire air pressures, and lights. In addition, their daily reports on engine operation, brakes, steering, and other performance conditions

One type of weekly gasoline consumption record for use by operators of truck fleets

Form 121—8-4-25—500

GASOLINE RECORD

Date				Date				Date				Date				Date				Date				Date			
Vehicle Number	Mileage	Gallons Used	Miles Per Gallon	Vehicle Number	Mileage	Gallons Used	Miles Per Gallon	Vehicle Number	Mileage	Gallons Used	Miles Per Gallon	Vehicle Number	Mileage	Gallons Used	Miles Per Gallon	Vehicle Number	Mileage	Gallons Used	Miles Per Gallon	Vehicle Number	Mileage	Gallons Used	Miles Per Gallon	Vehicle Number	Mileage	Gallons Used	Miles Per Gallon



TIRE RECORD — TIRE NO.

MAKE	SIZE	DATE RECEIVED	WHEEL NUMBER GUARANTEED MILEAGE COST PER MILE COST PER UNIT

VEHICLE NO.	WHEEL NO.	DATE ON	DATE OFF	WHY REMOVED	MONTH	MILEAGE	MONTH	MILEAGE

Records for every tire used by a truck fleet should be kept on forms of this general style

intimately connected with their control of the truck, serve to indicate what the repair force on inspection must watch for in their nightly check-up.

In some fleets, especially those of large size, these records are combined with those indicating the loads carried and the routes and mileage covered. Both these records complete the picture the maintenance department desires in its work of eliminating troubles and high costs.

Route information is especially valuable for checking the performance of one make of truck against another, provided conditions are the same in all respects. In this connection, one make of truck is often condemned for poor performance through no fault of its own on some one route. Nine times out of ten, either it is geared wrong for the country it is operating in, is underpowered, or overloaded. In such cases, it may also be the fault of poor driving or even the fault of the customers whose unloading conditions may be materially retarding progress on the route. This situation and others where the reputation of a truck is involved, merit more than just blind guessing.

Choice of the proper vehicle for a given route is just as much a question of maintenance as is actual repair work itself. In the end, it is the wrongly placed vehicle that adds to the maintenance cost per mile.

The object of maintenance is to render deliveries as foolproof as possible and to accomplish it at the lowest cost per mile. This cost includes fixed charges in the shop, operation, and maintenance costs.

Many owners have learned their cost lesson from the operation of other than standard fleets. Mixed fleets involve many wasteful practices; as, for example, the carrying of a large parts supply, which in most cases becomes obsolete or a total loss after the trucks are succeeded by new ones or when more improved parts come on the market. Mixed fleets also slow up shop work because mechanics cannot become as expert as with but one type to work on. It is quite possible, also, that considerably more tool equipment will be needed because of the lack of uniformity of nut and bolt sizes, means for adjustment, etc.

Study of operating conditions entails such things as a comparison of standing and moving time, road and traffic conditions, and town or city regulations. Such points may seem only vaguely important as maintenance questions but they are surprisingly real factors in the performance of the vehicles. If the body, for example, is so designed that the driver must waste time in removing his goods, this point will be revealed in checking delays at stops. And if there are many stops over short routes, then the engine will be idling unduly. This means trouble somewhere, either in undercharging of the battery or perhaps the accumulation of an oversupply of fuel in the crankcase and the consequent thinning of the lubricant. Knowledge of such conditions on the part of the maintenance department serves to direct inspection and remedial shop work along lines that will prevent frequent or premature failures of units that are in severe service.

Road and traffic conditions also bear on the question of truck performance and the life expectancy of chassis units. Tire wear, brakes, fuel consumption, etc., are involved in a consideration of this phase in operation. This is just one more variable in truck costs that makes record keeping all the more necessary to gain a true knowledge of actual conditions and the cause for existing costs.

Economy in shop practice also is to be striven for. Often, excess costs are traced to too large a working force; or, conversely, to one that is undersized. In any case, shop records should be such that they can immediately spot such situations.

Shop economy also involves such questions as lighting; nearness of stockroom, washroom, and other conveniences to the working force; ventilation, cleanliness, and comfort.

Even the cleanliness of the underparts of the vehicles when they come in for inspection and repair has a bearing on how quickly the work can be accomplished. It is far easier for a mechanic to check or repair a clean unit than one that is covered with grime and what not. Consequently, in most modern truck shops, all trucks are thoroughly washed before shop work starts.

When the work is started, the mechanics must have on hand the latest time- and labor-saving tools. Speed wrenches, electric grinders, quick-operating jacks, mechanical lifts or well-lighted pits to permit ease of work under the chassis, power-operated greasing outfits, air compressors, and testing apparatus are just a few of the things in a shop that make for a thorough job as well as a quick one.

Under well-regulated maintenance, every part of a truck is inspected periodically, either at one time or spread over so as to complete the work in three or four weekly intervals. In some of the larger shops, this inspection and attendant adjustments and work are accomplished by specialists skilled in electrical, engine, clutch, or rear-end work. When they are not engaged in truck inspection, they are rebuilding parts.

Under the unit-replacement shop system, this rebuilding of worn units creates a ready supply of parts that may be substituted for faulty ones at the time a truck is in for mechanical attention. Spare engines, rear axles, clutches, and other parts are always on hand for the purpose of shortening the visit of a truck to the shop. In some cases, trucks have been completely renewed with salvaged units in one or two days.

Under the constant inspection system, each part is worn to the limit of its safety and usefulness. It is asserted that this method is less costly than other systems because new parts are added only when the parts they replace are worn out. Some parts may be renewed quite frequently, while others are replaced at greater intervals, according to the severity of the service.

In the constant-inspection system, the vehicle does not reach the like-new condition which exists when it is

Truck No._____ **Date**_____

Odom._____ **Inspected by**_____

✓ *Found All Right* X *Wrong and Remedied* A *Needs Further Attention*

Step		Motor apron		Main shaft exch.	
Dash repaired		Front pan		Counter shaft exch.	
Bush. pedals and shafts		STEERING		Pilot bearing	
Catch on pedal		Adjust steer gear		New gears	
Seat structure repair		Bush. steer gear		Main shaft flange	
Cushion		Exchange steer gear		Grease level	
Front fenders		Drag link		Fork and rod	
COOLING SYSTEM		Tighten steer conn.		Links and pins	
Radiator tight on frame		New cross rod bolts and bush.		Bar bolt and bush.	
Water leaks		New spindle pins and bush.		Bar plate adjustment	
Pack pump		Wheels true		Gear shaft lever tube	
Exchange pump		Bearing adjustment		" " " bush.	
Drive connection		Tram wheels		Pawl and ratchet	
Tight on frame		SPRINGS		Brake lever pawl and ratchet	
Water line leaks		Front spring set		Brake cross shaft	
Throttle connections		Side play		Brake cables	
MOTOR		L. F. exch.		UNIVERSALS	
Cross frame and bolts		R. F. exch.		Bush. front	
Motor bolts		Bush. springs		Bush. rear	
Carbon		" spring hooks		Sliding shaft worn	
Valves		" " shackles		Grease	
Connecting rods		New bolts		All bolts	
Wrist pins		Spring clips		REAR AXLE	
Overhaul top case		Measure axle		Adj. pinion	
Adj. valves		Grease leaves		Adj. jack shaft	
Clean case		Rear spring set		Adj. master gear	
Throwing oil		L. R. exch.		Overhaul assemb.	
Cylinders worn		R. R. exch.		Exchange assemb.	
Main bearings		Cross exch.		Wheel flanges	
Motor exchanged		Bush. front hangers		Oil level	
MAGNETO		Bush. springs, front end		Adj. foot brake	
Tight		" " rear end		Adj. hand brake	
In line		Shackles and bolts		Exch. brakes	
Clean, adj.		Bush. cross spring		Reline foot	
New points		Center bolts		Reline hand	
Exchange		Spring clips		Pins and cotters	
Spark plug gaps		Grease		Drums	
OILER		CLUTCH		Wheels true	
Tight		Finger adjustment		Adj. of bearings	
In line		Space on collar		Grease wheels	
Feeding.....drops		Pins worn			
Adj. to.....drops		Lock nuts tight			
CARBURETOR		Throw out			
Flooding		Trunion and bushings			
Intake tight		Cross shaft and bush.			
Hot air tube tight		Fork			
Gasoline line tight		Spider and bosses			
Chaffing		Adj. clutch shaft			
Clean strainer		Wash clutch			
Tank and conn.		Reline clutch			
Cover		Center plate exch.			
Overhaul		Clutch shaft exch.			
Exchange		TRANSMISSION			
EXHAUST		Tight on frame			
Exh. pipes tight		Pans			
Wired		Grease leak			
Gaskets		Adj. top shaft			
Tight on frame		Adj. lower shaft			
Repaired		Line gears			

Reports of all truck inspections should be made in detail

overhauled, as there always are some worn parts giving further service after other new parts are installed. The principal disadvantage of this system is that the truck spends more time in the shop than under other systems. Consequently, it is necessary to have a large surplus of trucks on hand, in order to permit repairs being done. While this might appear to present an insurmountable difficulty as regards increased costs due to investment and overhead charges, it is said not to hold true where delivery needs fluctuate radically.

Some operators have eliminated periodic inspections and substituted a schedule of daily care and maintenance. In such cases, specific instructions for the inspection of the trucks each night are so divided that complete coverage of the vehicles can be accomplished in six days. This has worked well in small fleets where driver requirements include mechanical knowledge. It is asserted that this responsibility creates more driver interest in the care and upkeep of the vehicles.

Regardless of what system is used, it is apparent that the cost of maintenance is something that merits constant vigilance, not only by the maintenance head but by company officials as well. The average truck dollar, according to figures prepared by the Iowa State College, is apportioned as follows:

Maintenance, 29.6c.; depreciation, 27.2c.; gasoline, 15c.; tires, 9.5c.; interest, 9.2c.; garage, 4.7c.; insurance, 3c.; lubricants, 1.8c.

Maintenance cost per mile will increase as each year goes by, but by good management such increases can be kept low, so that by the end of the third or fourth year they will not prove a disturbing factor.

Maintenance cost on a mileage basis ranges from 7 to 8c., depending among other things upon age of vehicle, operating conditions, drivers, and repair methods. At 10,000 miles a year per vehicle in a fleet of ten, to cut the cost just 1c. per mile gives a saving of $1,000. Such a cut is not difficult of achievement when full account is taken of all the cost factors involved. Often such a saving can be greatly exceeded.

The chances for maintenance economy as well as the increase of vehicle life are unlimited. When it is figured what even a fractional saving per mile involves, then good management becomes a factor of real importance.

This Business of Pickling

Part One—
Agricultural and Curing Problems

By W. G. WORMLEY
General Plant and Production Manager, Widlar Products, Standards Brands, Inc., Cleveland, Ohio

"ONCE a pickle man, always a pickle man," an old saying goes. There is a challenge in this branch of the food industry, full of technical and economic hazards and perplexities, that holds the continued interest of those who grow to know it. After having spent a year or two in the work, few men ever leave.

The pickle business appears to be a very simple matter on a superficial investigation. Closer examination reveals a mass of minute details that must be mastered to attain success. Basically, processing of pickles is still an art. Science has crept into the pickle business only in a few places. For, like so many of the industrial arts, mankind has learned the "how" through centuries of trial and error, but not very much of the "why."

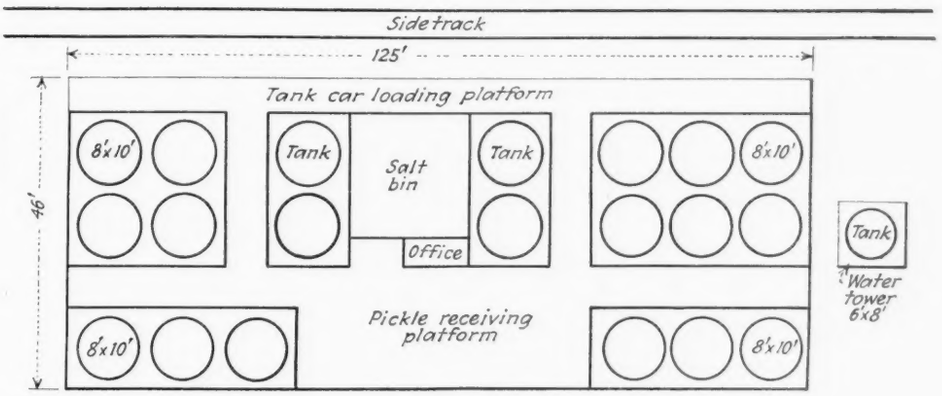
For example, much stress is placed on the proper soil for raising the cucumbers—"pickles," they are always called by a pickle man. There is a belief that good pickles can be grown only in certain states, where climatic and soil conditions are considered correct. As a matter of fact, this probably is much less a matter of technical importance than it is one of economics. Only within a very few years have we come to realize that it is possible to raise and cure good pickles in the Southern states.

The pickle business can thrive only where pickles can be raised economically, where mass agriculture production of the proper sizes and varieties is sufficiently remunerative to growers to warrant acreages sufficiently large to be also of interest to the pickle salter. As a result, certain states have become well known to the industry as good pickle states, such as Indiana, Michigan, Wisconsin, Ohio, Mississippi, Texas, California, and Colorado. Although they are better adapted for pickle culture than most of the other states, it probably is true that in every state there are regions well suited for pickle growing.

Pickling is one of the few businesses in the food industries closely tied up with economic success in the production of raw material. Unless the farmer can make a substantial profit in the raising of pickles, he simply refuses to raise any at all, a fact closely associated with the back-breaking of picking them or the expense of hiring others for the task. Despite the fact that the pickle salter offers the grower a definite market at a prearranged price for all of his produce, the average farmer would rather grow other crops involving less labor and likewise a greater speculative element in marketing.

On account of this close tie-up of agriculture and pickle salting, the principal producing areas are regions where the soil is a good sandy loam. Properly fertilized, this soil is ideal for pickle culture. Not every farmer knows how to raise a good crop of pickles; in fact relatively few of them understand it, which makes it necessary for the pickler to have field organizations to impart this information to the grower. Furthermore, because only a few varieties of pickles are suitable for com-

A Michigan pickle patch, showing condition on the vines on July 1. Later they become much more luxuriant



Plan of a "standard" pickle salting station with a 10,000 bu. capacity at Sanford, Miss. This is an inclosed station, but the same plan is used for the open stations

mercial pickling, it is imperative that the buyer furnish his growers with the proper seed.

Large manufacturers today are selecting their own garden seed with an eye first to quality, then to size, uniformity, texture, and then yield. To increase the length of the bearing season, and consequently the productivity of the vines, there is only one consistent method—the use of earlier maturing strains of pickle. Usually, the first killing frost in the fall determines the close of the season, although there are occasional autumns

Growers delivering green pickles to a salting station at Wiggins, Miss.

where the frost holds off till a long time after the vines have ceased to bear. Fertile soils and the proper use of fertilizers also help to maintain the yield per acre at a reasonably high level. This is an important point, because unless the yield to growers at a given salting station is satisfactory, it may fall to a point below that which will interest them, and the next step will be that of closing the station. Here again is evidence of the close relationship of agricultural success to the economics of pickle salting.

Pickles give a quicker cash return to the grower than almost any other crop he may raise, for in most localities it is only six weeks from planting time until the vines begin to bear, and usually only another six weeks from the first receipts of green pickles until the harvest is finished. Then too, nearly all manufacturers pay cash for each delivery of pickles. Yet, in spite of the greater assurance of a return from this crop for his labor above that from most of the other crops, the grower nearly always has to be "sold" on raising a crop every year, because of his dislike of the labor of picking.

As a result of this agricultural paradox, the localities most likely to lend themselves to successful pickle culture are those of proper soil conditions which are inhabited by farmers who are low in cash resources and need a ready source of money. Farmers who, either through unusual skill or fortuitous circumstances, are able to raise cultivating crops such as corn or the small grains, are not often amenable to signing a pickle contract.

Some idea of the remuneration to the grower may be gained by the following relationships, based on our own experience. One acre of pickles, properly cultivated and picked, brings in a cash return equal to that from ten acres of wheat in the North or ten acres of cotton in the South. This ratio is based on the prices obtaining in normal years. Naturally in years of abnormal prices, such as 1931, the ratio does not necessarily hold. And of course, in spite of all efforts and precautions, the weather can make or unmake the pickle crop and upset the best laid plans of men and pickle salters.

The pickles usually are purchased from the growers in three grades:

Small (No. 1)—Pickles from 1 to 3 in. long,

Large (No. 2)—Pickles from 3 to 5 in. long,

Nubs and crooks (No. 3)—Pickles of small size which are nubby, crooked, or otherwise misshapen.

By well-managed concerns, the grower is required to sort his pickles into these three grades before he delivers them to the salting station, where they are weighed, inspected, and then paid for. The usual method of buying is to pay for the scale ticket or an order held by the grower.

Salting stations usually are groups of cypress tanks of assorted sizes, having a capacity of from 200 to 1,000 bu. of pickles each. In late years the tendency has been to use tanks 10 ft. in diameter and 8 ft. high. A bushel of pickles weighs 50 lb. before salting. After salting and curing the pickles will weigh somewhat more, on account of the absorbed salt, although this is partially compensated by the loss of sugar from the cucumbers by osmosis during the early curing and fermenting stages. The custom of the trade, however, is to use the 50-lb. unit as a bushel whether the pickles are green or salted.

Tanks must be made tight and thoroughly soaked before the salting season. Furthermore, good practice requires thorough sterilization of the interior of the tank, preferably with hypochlorite of some sort, to get rid of undesirable forms of bacteria which may be the cause of spoilage. After sterilization, the tanks are thoroughly washed to remove the disinfectant, the outlet hole is carefully plugged, the pump box is inspected to make certain that it is properly in place, and finally 6 to 10 in. of brine is placed in the tank. The strength of this brine, determined by salometer, is variable, depending on the latitude in which the station is located and the opinion of the various pickle companies as to the proper method of procedure. Because pickling is still very much of an

art, and the age-old operation of curing pickles by putting them into brine and allowing them to ferment only superficially understood, there is a considerable difference of opinion as to the proper strength of brine to use. The brine strengths used today vary between 30 deg. and 40 deg. salometer (30 to 40 per cent of a saturated solution of salt in water). Most concerns use brines of 32 to 34 deg. salometer strength.

In our December number, "This Business of Pickling" will be concluded. Curing of genuine dills will be described, as well as processing and packing problems for processed dill, sweet, and sour pickles.— ***The Editors.***

We know a little about the effect of using weaker or stronger brines, but next to nothing of the mechanism of the operation. Weaker brine permits a more rapid fermentation and a more rapid cure, whereas the stronger brines have a retarding effect on both of these functions. But nobody seems to have an exact knowledge of what constitutes the so-called curing of pickles, although, to be sure, there are many theories. Of course, it is very easy to determine whether or not a pickle is properly cured when it is cut in two merely by looking at it.

One theory is that the "cure" is the transformation of the starch in the green pickle to dextrines or sugars, accompanied by diffusion of the salt brine and the acid produced by fermentation into the pickles, but this theory fails to explain other important features of pickling. For example, low-salt curing produces a much less hardy pickle than high-salt curing. This is a very common observation of all in the pickle business.

After placing the brine in the tank, the pickles are dumped in, and more brine is added to keep them submerged. When the tank is full, the head or cover is placed over the pickles and keyed down, so that the brine comes up over the head. More salt is added at intervals according to the schedule in use by the particular manufacturer. A schedule such as the following is frequently employed: Raise the brine by 2 deg. of strength salometer every week until 50 deg. strength is reached, after which the brine strength is increased at the rate of 1 deg. per week, until the final strength is attained. Here again there are differences of opinion of the proper end point. It varies between 60 and 70 deg. salometer. In a measure it is controlled by the temperatures of the winter weather where the tanks are situated, for pickles should not be allowed to freeze.

After six to twelve months, according to the brine strength and the prevailing temperatures, the curing is complete. In warmer climates the cure is more rapid than in the colder ones. During this long curing period, the tanks must be inspected weekly or semi-monthly to be certain that they are not leaking. The tanks also are "pumped," to be sure that the brine is thoroughly mixed. Whenever the brine leaks away sufficiently to expose pickles, they are sure to be ruined.

In some respects tanks of pickles in open salting stations are more easily cared for than those in buildings—i.e., closed stations. This is due to the very beneficial effect of the ultra-violet rays from direct sunlight, which prevents the growth of *Mycoderma,* or scum yeast. The scum always develops on tanks where access of sunlight is prevented, as long as any lactic acid remains in tank. Very recently Prof. Rahn, of Cornell University, has proposed the use of short periods of irradiation with ultra-violet rays from artificial sources to prevent the scumming of indoor tanks. Such a procedure confers the benefit of outdoor tanks without any of the drawbacks, except, of course, the cost of the artificial irradiation.

Occasions have been observed in closed salting stations where the sunlight was kept away from the pickle tanks where tanks of pickles have refused to produce any scum. In the language of old-time pickle men, "the brine has gone dead." A chemical examination of the brine from such a tank that refuses to scum usually shows that the lactic acid has practically entirely disappeared, and that the pickles are dependent upon only the high concentration of salt for their preservation. At the present moment is a disputed point among the better informed pickle men as to whether such a tank is in a dangerous condition or not, the danger being incipient spoilage of the pickles. Probably a great deal depends on the previous history of the pickles.

After the pickles have reached the "cured" stage, they are described as "salt-stock," and are ready for manufacturing at the finishing plant. The procedure from this point will be described next month.

Open pickle salting station at Norwalk, Ohio

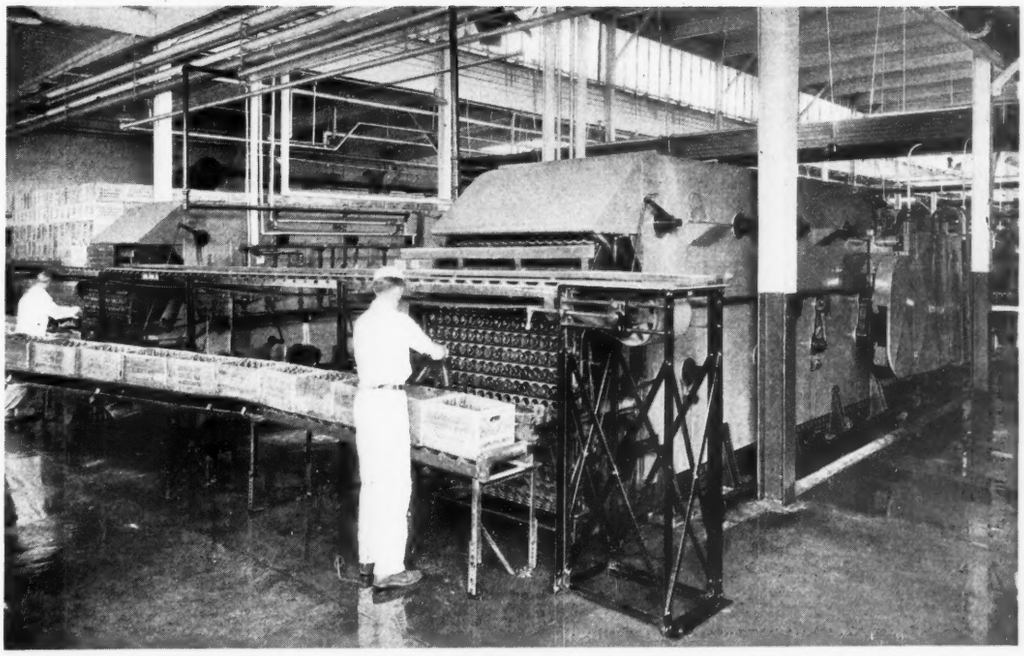


Fig. 1—Bottle washing unit of direct-feed type

Washing Bottles in Modern Equipment

By **HERMAN A. WOLTERS**
Superintendent Bottling Plant
Gottfried Krueger Brewing Co.
Newark, N. J.

MODERN cleaning equipment is an important factor in the production of bright, clean, sterile bottles, by means of which bottlers are establishing among consumers the idea that reliable bottling plants are today producers of pure food products. However, bottle cleaning is a chemical as well as a mechanical operation.

Under present-day methods, all phases of the operation are carried out in a unit machine comprised of soaking, washing, and rinsing compartments. Because of the different types of equipment in use and because the character of the food product or beverage to be contained by the bottle determines how complicated will be the chemical phase of the operation, no specific directions can be given for the washing of bottles.

If it were only a matter of removing dirt and similar material, which might contaminate and thus lower the market value of the contents, the cleaning would be quite simple. Such material could be removed almost wholly by mechanical means. Unfortunately for food processors, this simple method is not sufficient. The substance to be removed from a bottle by soaking and washing usually consists of dried content remnants, albuminous matter, and invariably countless numbers of wild yeast and bacteria that have found their way into the bottles. The remnants left in the bottle furnish these microorganisms with abundant nourishment for propagation. In the dairy industry the bottles not only must be free from visible solids and invisible organisms but must have all traces of fat films removed and be sterilized. In the soft drinks and cereal beverages, the cleaning and sterilizing have to be done in a manner that will give a clear sparkling bottle which will enhance the physical appearance of its transparent contents. Rinsing, also is quite important. It may happen that the spores formed by these wild yeast and bacteria will not be completely removed during the soaking and washing, even though the bottles appear clean. These spores possess much greater vitality and resistance than their parent cells and are not always destroyed unless special precautions are taken. Thorough rinsing aids in their removal.

Occasionally, bottles containing remnants of varnish, oils, chemicals, and similar materials find their way back to the bottling plants. In such cases it is advisable to discard the bottles rather than attempt to clean them.

In both the dairy and the beverage industries, in which empty bottles are returned for filling, dried residue, labels, neck foil and wire, and even stoppers that have been forced into the bottles present additional problems to the bottler. These returned bottles, when filled, must be of as first-class condition and appearance as a bottle that is being used for the first time. The beverage bottle offers more opportunity for psychological influence upon the consumer of its contents than does the dairy bottle, whose content is opaque and does not lend itself so

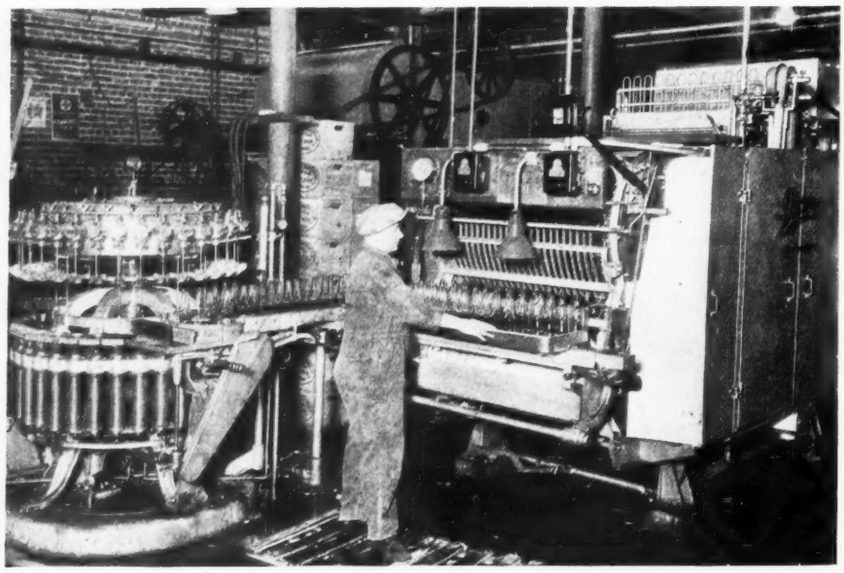


Fig. 2—Bottles cleaned and rinsed ready for filling machine

readily to the clear sparkling conditions of the bottle surface. Mayonnaise and salad-dressing products and other food products commonly packed in glass containers present essentially the same problems in cleaning as do bottles; a clear, sparkling appearance and freedom from traces of odor or taste of sterilizing agents are requisite.

The first consideration in washing bottles is the preparation of the soaking solution and regulating the temperature. The stronger and hotter the solution the more effective will be its soaking properties. This need be considered only to a maximum of about 170 deg. F. in temperature and 5 per cent by weight of 60 per cent caustic soda in strength. Since a 5 per cent caustic soda solution has been found extremely effective, there is no need of making the solution stronger. Also if a temperature of over 170 deg. F. be used, there is danger of excessive breakage.

The performance of other alkalis can be readily determined by experiment. The difference in the alkalis becomes apparent from the type of precipitate formed when added to hard water. In this test, one determines the quantity of alkali needed to soften the water, which will be in addition to the quantity required to give the strength of solution essential to economic operation and to give the desired results. Hot solutions of caustic soda or other suitable strong alkalis are recommended to give proper sterilization. Sometimes this concentration is prescribed, depending on the condition of the bottles to be washed. If the bottles have been in circulation or have been stored away unwashed for a period of time, they naturally will be subjected to different strength solutions; the time factor in passing bottles through the machine remains the same.

Since soaking is for the purpose of softening and dissolving the visible dirt and wetting the labels so that they will drop off the bottles, the bottles are carried through the soaking machine in an endless chain moving continuously through a tank divided into compartments. These compartments contain the heated cleansing solutions. To prevent weakening and contamination of the alkali solution, the bottles are first fed into the carriers neck down, so that any remaining fluid will be emptied out into a special tank which drains to a sewer. As the bottles pass into the first compartment, they become filled with the washing solution and are emptied into the same compartment as they travel on to the next compartment. In this manner, the bottles pass through three compartments, being filled and emptied each time with the cleaning solution. In a fourth compartment they are filled with fresh water and emptied.

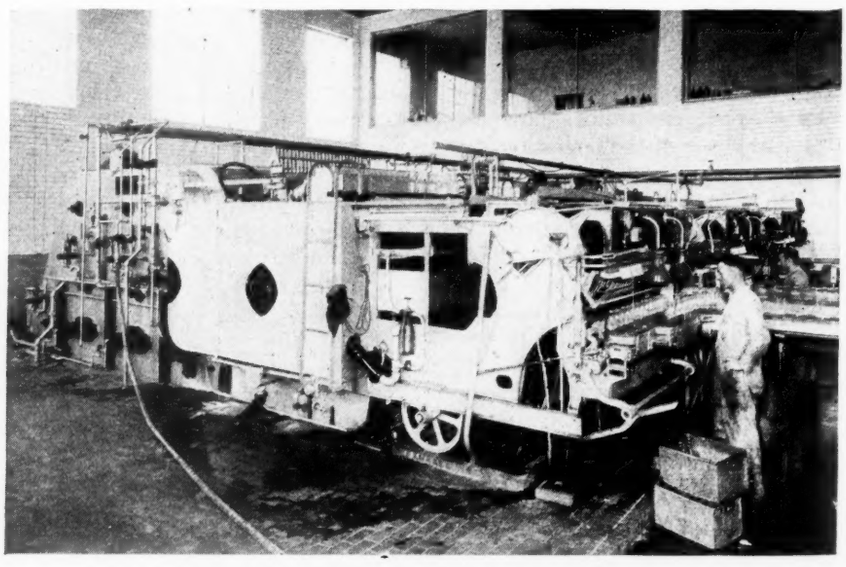


Fig. 3—A view in a modern milk plant using washers of the basement feed type

The cleaning and sterilizing power of the solution is due to its alkalinity, which may be lessened or neutralized by anything of an acid nature on the inside or outside of the bottles, such as label paste or the acetic acid found in the sour remnants. Because of this neutralizing action regular additions of 60 per cent caustic should be made to the first compartment to maintain the alkalinity of the solution. For average practice, in beverage and soft-drink bottling plants, where modern equipment is used with soakers of four compartments, the first compartment usually contains about 2 per cent solution at 105 deg. F.; the second, about 4 per cent solution at 160 deg. F.; the third, about 3 per cent solution at 130 deg. F.; and the fourth, fresh water only, at about 90 deg. F. In this system, the first and last compartments are not so hot as the middle one, thus reducing the breakage. The temperature of each tank is maintained automatically under thermostatic control located on the outside of the soaker tank. A separate regulator controls each compartment.

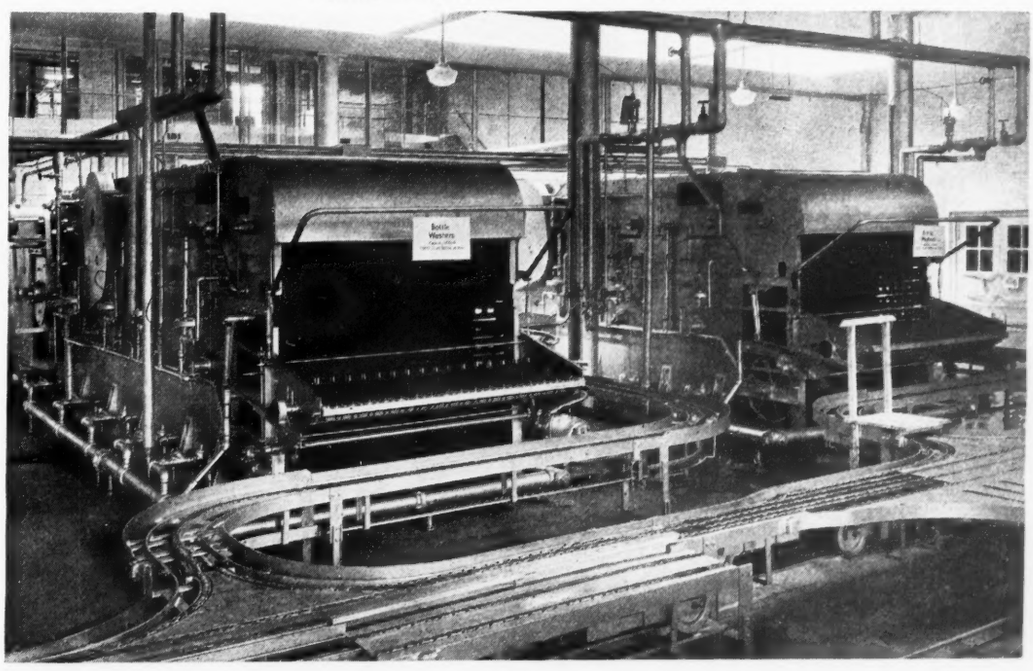
In milk plants, the operation is practically the same except that the temperature in each compartment is raised, the first being about 110 deg. F.; the second, 150 deg. F.; and the last two compartments 180 deg. F. In addition, the water used for the brushing and rinsing process usually is at a temperature of 170 deg. F. From this high temperature, the bottles pass through a sterilizing and rinsing spray, where they are slowly cooled down to 60 deg. F. before passing to the filler. This method is known as the sterilization process and is necessary in milk plants, due to the grease or fat films which contain countless numbers of microorganisms. Thus, should the bottle not be thoroughly cleaned in the washer, there will be less danger to the subsequent content than had the bottle not been sterilized. It is not intended to imply here that if the bottles are sterilized there should be any less care taken with them during the washing. Nevertheless, it is a fact that "sterilized dirt" is preferable to unsterilized dirt, teeming with all kinds of microorganisms.

The substances not affected by the soaking solution have to be removed by brushing in the washing operation. Washing is more of a mechanical operation and is performed by the revolving and consequent centrifugal spreading of rubber or hair brushes of different shapes which enter and leave the bottle. Their function is to clean the body and the inside bottom of the bottle, where the most stubborn crust of foreign matter usually is found; in most instances the necks are quite easily cleaned. This operation is performed in seven stages; brushing the outside of the bottle, followed by two stages of rinsing with fresh water and two stages of inside brushing and two more stages of rinsing, after which the bottles are carried in an inverted position in order that they may properly drain before reaching the discharge.

The effectiveness of the brushing does not depend so much upon the style of machine used as it does upon the brushes and their condition as they become worn prior to being replaced. Furthermore, since the bottles are in a vertical position, the dirty rinsing water is continuously running out, and the brushes, as they move upward and downward, are always being supplied with fresh, clean water coming from a spindle to which the brush is attached. In machines on which bottles are held in an inverted position with their mouths downward, the washing spray of water also acts in a measure as a rinsing spray. It has been found that this rinsing in machines using vertical or upright spindles where the water issues through a hole in the spindle and brush, is insufficient in all instances. Because some of the wash water remains adhering to the inside of the bottle at the time the brush leaves the bottle, it becomes necessary to have separate rinsers as part of the machine.

After the bottles have been soaked, washed, and rinsed they are discharged in an upright position, onto a conveyor or belt, where under powerful lights they pass inspection before being filled. Inspection of washed bottles is a very valuable part of the bottling process if it is carefully and properly done. However, this operation is a most difficult and trying one; in fact, it is the most trying and difficult work in the bottling plant.

Fig. 4—Direct-feed type of bottle washers with an individual capacity of 10,800 quart milk bottles per hour



Bringing Quick-Freezing To Seasonal Crops

The first authentic description of the multi-plate freezer

By CLARENCE BIRDSEYE
Vice-President
General Seafoods Corp.

ELAPSED time between harvesting and freezing is one of the most important factors determining quality of quick-frozen foods. Yet so long as products must be brought to a freezer from scattered centers of production, there are definite limits below which this elapsed time cannot be reduced—quality or no quality. The logical alternative, of course, is to bring the freezer to the products.

Heretofore, limitations of quick-freezing equipment, or any kind of freezing equipment, for that matter, have checked this course of action. Large quick-freezers, such as the double-belt machine, although efficient from the refrigeration standpoint, require large floor space and permanent installation. If advantageously located for a single seasonal product, interest charges during the necessary months of idleness may raise unit costs to a prohibitive degree.

A portable unit which can be operated in the heart of the producing region for one product during the period of optimum maturity and price, and then be moved on to other products and other districts as the season progresses, has obvious advantages. The gain would be negligible, however, if operating costs and capital investment per pound of product frozen were to be increased thereby. Elasticity, too, must be preserved if the freezer is to be used on products of varying physical and thermal characteristics.

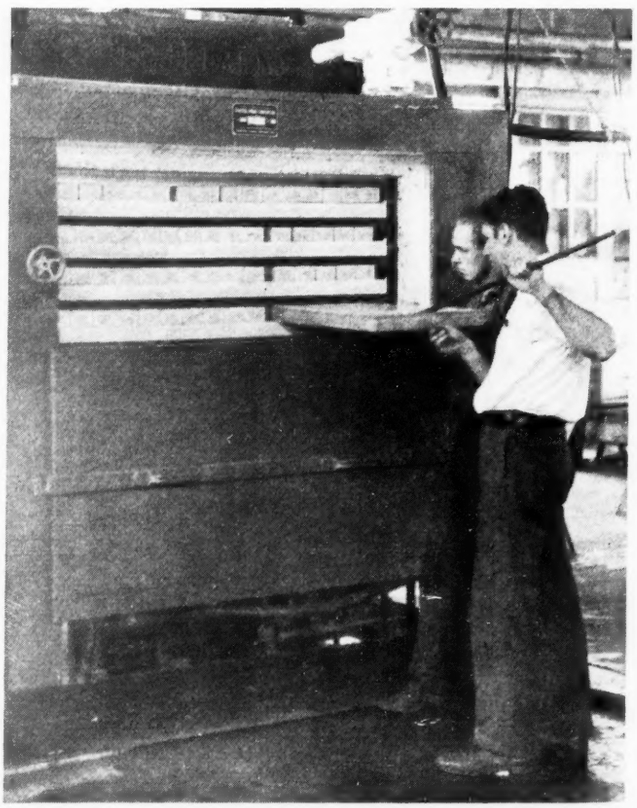
Units Now in Operation

The Birdseye multi-plate machine was developed with this reasoning in mind. A number of these units have been operating directly at the harvesting source during the season just past. At the plant of the Medomak Canning Co., Winslow's Mills, Me., berries, corn, and string beans were frozen. At the Snider Packing Co. plant in Bridgeton, N. J., two such units were used to freeze a "pilot pack" of 90,000 cartons of lima beans. Blueberries and fish were frozen at St. Johns, Newfoundland, at the plant of Harvey & Co.; and in the Chester County Mushroom Laboratories, at West Chester, Pa., two units are now being used to freeze 50 tons of mushrooms in consumer packages. Others are operated at Hillsboro, Ore., to supplement the belt freezers at the Ray Maling Co. plant; in the laboratories of Pacific Frozen Foods at Oakland, Calif.; at the New York State Agricultural Experiment Station, Geneva, N. Y.; and at our development laboratory in Gloucester.

Employing the same direct-contact and controlled-pressure principles used in the double-belt machine, the plate freezer costs less to install and operate than the ordinary sharp freezer handling an equal capacity, and requires less floor space. For instance, a sharp-freezer capable of freezing 50,000 lb. of fish per day at 15 deg. F. would cost, without building or compressors, more than $20,000 and would occupy not less than 4,000 sq.ft. of floor area. Multiplate freezers of the same capacity would cost less than $18,000 and would themselves occupy only 120 sq.ft.—and only about 400 to 800 sq.ft. including all necessary working space. Obviously, sharp freezers are non-portable.

As its name implies, the multiplate freezer consists of a series of refrigerated metal plates placed one above the other, capable of being opened to receive products between them, and closed upon the products with any desired degree of pressure. The plates consist of alumi-

Loading a four-station freezer with packages of lima beans. Refrigerating machinery is directly below the freezing plates



Removing the frozen packages from the opposite side of the freezer to be packed in insulated cartons

num alloy cast around metal coils, machined and ground smooth on both sides. In the commercial models, they are 43 in. wide, 52 in. long, and about 2 in. thick. The relative movement of the plates is obtained by means of an ingenious arrangement of pantographs, or "lazy tongs," and the motion and pressure are imparted by means of a hydraulically operated cylinder located under the bottom plate. The entire apparatus is inclosed in an insulated cabinet and can be operated in ordinary room temperature.

Pressure on the product between the several plates is maintained automatically at any desired point from practically zero up to more than 150 lb. per sq.ft. This accurate control of pressure and the great conductivity of the metal plates insure extremely rapid extraction of heat from the product being frozen. In practice it has been found that with the plates maintained at about —25 deg. F., 2-in. packages of seafoods, meats, vegetables, and fruits can be completely frozen in less than 90 minutes. Ordinary unpackaged fish fillets freeze in 8 to 10 minutes.

Inasmuch as the freezing of the product progresses simultaneously toward the center from both sides in a sharply defined line, no single cell or group of cells, even within a paper board carton, requires more than 15 to 20 minutes to pass through the "zone of maximum crystal formation."

The fact that substantially all products can be quick-frozen at no lower than —25 deg. F. has made possible the use of direct expansion, single-stage ammonia as the refrigerant, the suction line operating at approximately 3 lb. back pressure. All models have sliding doors back and front, which give clear openings for loading and unloading; and the doors on each end are removable, making every part of the apparatus easily accessible.

Smaller models of the machine are entirely self-contained and can be operated anywhere that electric current and cold water are available—in a heater room or even on a truck. The larger models also are portable, and refrigeration may be supplied to them either from ammonia compressors furnished for the purpose or from refrigeration facilities already available in plants in which the machines are to be used. Brine may, if desired, be used as the refrigerant, instead of ammonia.

Refrigerant Completely Inclosed

Inasmuch as the refrigerant is completely inclosed, the apparatus may be operated with the plates at any angle, making it suitable for use aboard vessels operating at sea, and is capable of handling any type of bulk or packaged products which such operation may require.

By varying the number of plates used, the capacity of freezers of this type can be increased without increasing the floor space. As a matter of fact, four-station (five plate), five station, and eight-station models, equipped with plates 43x52 in., all occupy a floor space of 37.5 sq.ft.

Table I shows the dimensions and capacities for various models of the freezer. The four-station machine (Fig. 1) is self-contained and has compressor, tanks, and pressure pump installed beneath the insulated freezing chamber. It is mounted on ball-bearing castors. The small two-station machine is equipped with plates that can be swung to a vertical position for freezing liquids.

Patents have been granted covering this multiplate portable equipment, which has been designed for use under the basic patent rights of the original Birdseye process. Use of the machines, however, will not be restricted to organizations associated with General Foods Corp., as a licensing system to make it generally available is planned.

Table I—Sizes and Capacities of Multiplate Machines

	8 Station	5 Station	4 Station	2 Station
Number of plates	9	6	5	3
Size of plates (in.)	43x52	43x52	43x52	18x24
Maximum opening between plates (in.)	3½	7	3½	4½
Permissible product thickness (in.)	½ to 3½	1 to 6½	½ to 3½	½ to 4½
Capacity per hr. (lb.)	746	466	373	30
Capacity per 24 hr. (lb.)	17,904	11,194	8,952	720
Refrigerant used	Direct-expansion ammonia, or calcium brine	Direct-expansion ammonia, or calcium brine	Direct-expansion ammonia	Direct-expansion ammonia
Temperature control	Manual or automatic	Manual or automatic	Automatic	Automatic
Floor space occupied	66x82 in. 37.5 sq.ft.	66x82 in. 37.5 sq.ft.	66x82 in. 37.5 sq.ft.	36x48 in. 12 sq.ft.

ABSTRACTS OF CURRENT LITERATURE

CHEMICAL CHANGES IN THE FAT OF FROZEN AND CHILLED MEAT. PART III. FROZEN BACON. C. H. Lea. *Chemistry and Industry,* Vol. 50, p. 343T; Sept. 11, 1931.

The free acidity values observed in the fat of tank-cured bacon during storage at —10 deg. C. for periods up to 152 days, followed by hanging at 15 deg. C. for eighteen days, gave no indication of attack by micro-organisms on the fat, nor were any signs of tainted flavor observed which might have been attributed to this cause. The superficial fat of freshly cured bacon contains active oxygen in small quantities, sufficient to render the fat very susceptible to further oxidation during storage. Smoking of bacon arrests the progress of superficial oxidation for a period of time.

* * *

DRY SKIM MILK IN ICE CREAM. W. V. Price and R. Whitaker. *Cornell University Experiment Station Bulletin 516* (1931). [From *Chemical Abstracts,* Vol. 25, p. 4630; Sept. 10, 1931.]

Dry skim milk, with the exception of the atmospheric-roll type powder, produced a normal ice cream in every characteristic that was measured. The atmospheric-roll process skim-milk powder can be used to produce ice cream of excellent quality if suitable precautions are taken to remove undissolved particles from the ice cream mix before homogenizing. A dry cool storage is recommended.

* * *

VITAMIN C IN SAUERKRAUT. B. A. Lavrov and N. Jarussova. *Biochemische Zeitschrift,* Vol. 229, pp. 115-127 (1930). [*British Chemical Abstracts,* A, p. 399; March, 1931.]

As regards its prophylactic antiscorbutic activity, the juice obtained from sauerkraut has about 5 to 10 per cent of the potency of orange juice, and is approximately as potent as unboiled cow's milk.

* * *

VITAMINS IN CANNED FOODS—XI. A CANNED FOOD DIET. E. F. Kohman, W. H. Eddy, and C. Z. Gurin. *Industrial and Engineering Chemistry,* Vol. 23, p. 1064; September, 1931.

Experiments with animals fed over a period of fifteen months on a diet consisting wholly of canned foods sterilized by heat show that the rate of growth and weight at maturity is much higher than that reported as normal. Either a diet more nearly the optimum than usual for these animals results from the combination of foods selected, or there is some heretofore unrecognized advantage in a diet made up wholly of canned (cooked) foods. The evidence indicates that canned foods may supply every dietary requirement, including vitamins B (B_1) and C, so often referred to as heat labile.

* * *

ALUMINUM CONTENT OF PLANTS, CHIEFLY FOOD PLANTS. Gabriel Bertrand and Georgette Lévy. *Compt. rend. 192,* pp. 525-9 (1931). *C. A. 25,* p. 2756 (June 10, 1931).

The plant is ashed and aluminum determined gravimetrically as aluminum phosphate, the details of analysis not being given. The aluminum content passes through a maximum during the first period of the growth of the plants. Of the values given, expressed as milligram aluminum per kilogram dry weight, are: young carrot, 30; old carrot, 22; potatoes, 76; onion, 93; apple, 13; tomato, 23; apricot, 60; peach, 64; maize, 5; white rice, 14; coffee, 46; lilacs, 74; iris, 85; Ceylon tea, 465; rhubarb, 166. Green leaves are rich in aluminum. Aluminum may play some part in plant synthesis.

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LATENT HEAT OF FOODSTUFFS. W. R. Woolrich, *Refrigerating Engineering,* Vol. 22, pp. 21-24; July, 1931.

The latent heat of fusion of fresh vegetables, fruits, meats, and dairy products is directly proportional to the moisture content by weight. The fusion points of fresh products are considerably depressed by the presence of salts, starches, and sugars. The presence of any alcohol, by virtue of the breaking down of the starches and sugars, lowers the fusion point rapidly. The latent heats of fusion of a number of foodstuffs are tabulated.

* * *

CANE JUICE LIMING AND CLARIFICATION. R. H. King. *Industrial and Engineering Chemistry,* Vol. 23, pp. 954-965; August, 1931.

Sucrose is destroyed by inversion or decomposition at all temperatures and pH's. High temperatures and low pH's result in large losses. Purity increase is a function of the substances that can be eliminated. Phosphates and silicates are not completely removed by moderate liming. Sulphates are very soluble; magnesium is eliminated at high alkalinity; iron and aluminum are removed with low liming. Glucose is destroyed by lime and heat. Careful routine control of liming, together with settling rates and purity determinations, will result in a higher sucrose recovery. An automatic continuous liming device which completely meets the lime control requirement is described.

EFFECT OF PASTEURIZING AND HOMOGENIZING TEMPERATURES ON CERTAIN PROPERTIES OF ICE CREAM MIXES. C. D. Dahle. *Journal of Agricultural Research,* Vol. 42, pp. 675-688; May 15, 1931.

Processing the mix at temperatures of 170 and 180 deg. F. decreases the degree of fat clumping, reduces viscosity and freezing time, and increases protein stability. Greatest benefits are obtained when the mix is both pasteurized and homogenized at the high temperatures. All of the ingredients may be mixed and heated to 145 or 150 deg. F. in a vat. The temperature can then be raised quickly to 170 or 180 deg. F. by means of a continuous heater just before the mix is passed through the homogenizer.

* * *

A METHOD FOR TESTING FOR ROPINESS OF BREAD. H. H. Bunzell and Marion Forbes. *Cereal Chemistry,* Vol. 7, pp.465-472. [From *Chemical Abstracts,* Vol. 25, No. 1, p. 150.]

B. Mesentericus, the cause of rope in bread, is believed to be the only organism in bread surviving baking temperatures possessing the enzyme catalase, which is capable of bringing about rapid decomposition of H_2O_2 to water and oxygen. By determining the change in pressure due to the liberated O_2 in suitably designed apparatus, a reliable index of the presence of the organisms appears to result. Illustrations of the apparatus used by the authors are shown.

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A. B. C. B. STANDARDS FOR BEVERAGE MANUFACTURING EQUIPMENT AND RECOMMENDED PRACTICES. American Bottlers of Carbonated Beverages, Washington, D. C. 1930 Edition.

Variety in sizes of pipe lines, fittings, and connections used in bottling equipment constructed by different machinery manufacturers has been the cause of considerable trouble in the construction of beverage plants. That the use of standard connections on the various units comprising the plant would greatly simplify matters, besides saving considerable expense and trouble to the machinery manufacturer and the bottler, is realized throughout the industry. The standards approved by the general committee and the executive board of the A.B.C.B. are contained in this bulletin, as well as other recommended practices for the promotion of greater efficiency and uniformity throughout the industry.

* * *

INFLUENCE OF AN EXCLUSIVE MEAT DIET ON THE HUMAN INTESTINAL FLORA. J. C. Torrey. *Proc. Soc. Exp. Biol. and Med.,* 28, 295-6. *Bull. Hyg.* VI, 5, 1931.

Two subjects (A and S) continued on an exclusive meat diet for over a year, and one (D) for 10 days. The fecal specimens varied in reaction from neutral to moderate acidity (pH 7.0 to 6.0) and were never definitely alkaline. Total bacteria dropped approximately

50 per cent. Except for the transitory predominance of *Proteus vulgaris* in subject A, there was no increase in the proteolytic flora. The *B. coli* count decreased markedly, while the *Lactobacillus acidophilus* and entococci groups were suppressed. The haemolytic *B. coli* types, at first greatly favored by the meat diet, later disappeared. The meat diet in A, S, and D favored particularly *Cl. welchii*, but after a year the counts were no higher than before. Tests of the proteolytic activity of the whole flora on a cooked minced meat substrate showed no increase over that of those individuals while on a mixed diet.

* * *

ALUMINUM VESSELS AND HYGIENE. G. Turan. *Aluminum 12* (15/16), pp. 3-4 (1930). *J. Inst. Metals 47*, pt. v, p. 292 (May, 1931).

Man absorbs 20 to 40 mg. per day of aluminum from his food, but if the food is prepared in aluminum vessels he may absorb as much as 110 mg. per day. The presence of salt or vinegar in foods cooked in aluminum increases the amount of metal dissolved by the food, but Turan considers that much larger amounts than those mentioned are harmless. To prevent undue contamination of food with aluminum compounds it is recommended to use wooden spoons for stirring during cooking, as metal spoons may increase the corrosion of aluminum vessels by electrolytic action. Aluminum foil for packing cheese is liable to be attacked, but aluminum vessels are not attacked by sweet milk.

* * *

GROWTH OF MICROORGANISMS ON CHILLED AND FROZEN MEAT. R. B. Haines. *Chemistry and Industry*, Vol. 50, pp. 223-227T; July 3, 1931.

Study of the growth of microorganisms on a stored carcass of lamb held at —5 deg. C. shows that there is at first a decrease in number, followed by an increase, due mainly to the growth of yeasts and molds. The increase of microorganisms in chilled beef is considered due to rapid growth of an organism of the *Pseudomonas* group. Appreciable changes may take place at zero under optimum conditions for growth of microorganisms, but changes in frozen preparations at —3 and —5 deg. were slight.

* * *

INCORPORATION OF VITAMINS IN BREAD. F. F. Tisdall, T. G. H. Drake and Alan Brown. *Journal of the Canadian Medical Association*, Vol. 24, p. 210: February, 1931.

Refined grain products are deficient in vitamins. Vitamins B_1 and E may be made available by incorporating wheat germ in bread. Vitamin D may be added by irradiating this wheat germ before incorporation into the bread, or else by the addition of irradiated ergosterol. Bread is a suitable carrier for these vitamins because of its universal distribution and large consumption by the wage-earning class.

MANGANESE AND DIET. A. R. Kemmerer, C. A. Elvehjem, and E. B. Hart. *Journal of Biological Chemistry*, Vol. 92, p. 623; August, 1931.

Experiments with mice show that the addition of traces of manganese to a diet of whole cow's milk supplemented with iron and copper has a favorable effect upon their growth. Other influences of manganese in the diet are described.

* * *

VARIABILITY IN EXPERIMENTAL BAKING. I—THE INFLUENCE OF MECHANICAL MOLDING. W. F. Geddes and others. *Canadian Journal of Research*, Vol. 4, pp. 421-482; April and May, 1931.

Machine molding gave no significant reduction in variability of loaf volume when an experienced baker conducted the hand molding tests. The machine-molded loaves were significantly lower in loaf volume and exhibited less break and shred, greener crust characteristics, superior grain, but inferior texture, and duller crumb color. Replicate bakings of one flour on five consecutive days gave highly significant differences in mean loaf volume for the different days. Machine molding may reduce but not eliminate the large differences in mean loaf volume which different operators obtain in baking the same flour. Considerable data on the 4,040 individual baking tests are tabulated and analyzed statistically. Much detailed work remains to be done so as to overcome variability in experimental baking.

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SALMON OIL AND CANNED SALMON AS SOURCES OF VITAMINS A AND D. C. D. Tolle and E. M. Nelson. *Industrial and Engineering Chemistry*, Vol. 23, p. 1066; September, 1931.

Commercial salmon oil is an important source of vitamin D, but the commercial oil now produced is not representative in quality of oil that can be produced from the standpoint of vitamin A and D potency. The oil now produced is used largely for technical purposes, and the annual production is about 300,000 gal. The canned salmon consumed in this country carries a vast supply of vitamin D that has hitherto received little, if any, recognition.

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GOVERNMENT PUBLICATIONS

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.*

Analysis of Special Jobs in Quality Milk Production. Federal Board for Vocational Education, Bulletin 154; 5 cents. Includes definition of jobs and duties. Of interest to management.

Transporting and Handling Milk in Tanks, by Ralph P. Hotis. Department of Agriculture, Technical Bulletin 243; 10 cents.

Foaming of Milk and Cream, by C. S. Leete. Department of Agriculture, Circular 108; 5 cents. A reprint of an earlier study reporting research data.

Pasteurization of Milk, by S. Henry Ayers. Department of Agriculture, Bulletin 342; 5 cents. Reprint without revision, largely summarizing regulatory requirements.

Permit Procedure Relating to Industrial Alcohol and Other Non-beverage Liquors. Bureau of Industrial Alcohol, Treasury Department. Outline of requirements and means of obtaining permits.

Effect of Heat Treatment Upon the Quality of Dry Skim Milk and Condensed Skim Milk for Ice Cream, by O. E. Williams and S. A. Hall. Department of Agriculture, Circular 179; 5 cents. A research report.

Some Factors Affecting the Viscosity of Cream, by C. J. Babcock. Department of Agriculture, Technical Bulletin 249; 25 cents.

Effect of Pasteurizing and Homogenizing Temperatures on Certain Properties of Ice-Cream Mixes, by C. D. Dahle and G. S. Barnhart. Reprint from Department of Agriculture, Journal of Agricultural Research, Vol. 42, No. 10; May 15, 1931.

The Outlook for the Dairy Industry, and Some Essentials of a National Dairy Program. Department of Agriculture, Miscellaneous Publication 124; 15 cents. An economic study.

Olive Oil. U. S. Tariff Commission Report 22, Second Series; 10 cents. An economic analysis, including studies of cost of production, domestic and foreign.

The Economic Aspects of Milk. Preliminary Report of Committee on Economic Aspects of Milk of the White House Conference on Child Health and Protection, issued by Department of Agriculture, Bureau of Dairy Industry. Relates largely to child welfare problems.

Tomatoes as a Truck Crop, by W. R. Beattie. Department of Agriculture, Farmers' Bulletin 1338. Revised July, 1931; 10 cents. Valuable for distribution to growers by purchasing canners.

Factors for Converting Percentages of Nitrogen in Foods and Feeds Into Percentages of Proteins, by D. Breese Jones. Department of Agriculture, Circular 183-C; 5 cents. Nitrogen content of proteins is not constant at 16 per cent, as usually assumed. Factors here given provide closer approximation.

Arsenical and Other Fruit Injuries of Apples Resulting From Washing Operations, by D. F. Fisher and E. L. Reeves. Department of Agriculture, Technical Bulletin 245; 10 cents.

Control of Botrytis Rot of Pears With Chemically Treated Wrappers, by Jacquelin S. Cooley and J. H. Crenshaw. Department of Agriculture, Circular 177; 5 cents.

Marketing Poultry, by Rob R. Slocum. Department of Agriculture, Farmers' Bulletin 1377; 5 cents. 1931 revision.

Market for Oils and Fats in Cuba and the Cuban Vegetable Oil Industry, by Harold B. Quarton. Bureau of Foreign and Domestic Commerce, Trade Information Bulletin 766; 10 cents.

Commerce Yearbook, 1931. Vol. I—United States. Bound volume from Department of Commerce; $1. Contains detailed information concerning business conditions and statistics collected by numerous government bureaus, trade associations, and trade journals.

Food Specifications. Federal Standard Stock Catalogue Board specifications, as follows: Canned prunes; dressed chickens (Broilers, fryers, and roasters); canned asparagus; canned apricots; canned pears; raisins; canned apples; tea; canned beets; canned applesauce; canned peaches; canned salmon; coffee; canned cabbage; pickles and relishes; beet or cane sugar; eggs; oatmeal and rolled or flaked oats; rice; olives; canned sardines; canned shrimp; chocolate; syrup; corn meal (white or yellow); buckwheat flour; fresh crabmeat; canned flaked fish; salted or smoked fish; fresh oysters; canned mushrooms; canned soups; pearl barley; graham flour (wholewheat meal); fresh fish; olive oil (edible grade); butter; wheat flour; canned cherries; canned pineapple; tomato catsup; and cocoa. 5 cents each.

BOOK REVIEWS

MARKETING PRINCIPLES. By John Freeman Pyle, Professor of Marketing and Economics, Marquette University. Published by McGraw-Hill Book Co., Inc., New York, N. Y. 1931. 565 pp., 9¼x6¼; 40 tables; cloth. Price, $4.00.

THIS book presents a careful analysis of various processes, practices, and problems involved in the marketing of a wide variety of goods as well as services. Methods of market evaluation, buying habits in specific fields, existing types of marketing agencies and other important related subjects are exhaustively discussed. Up-to-date facts and figures and well chosen illustrations are included.

The author has given full recognition to the new trends that during the last decade have become evident in the field of marketing of specific commodities and makes possible comparison of present against former methods.

O. FRED ROST.

* * *

THE AMERICAN SPICE TRADE SURVEY-REPORT. By Albert H. Doolittle. Multigraphed survey-report of the secretary of the American Spice Trade Association, 82 Wall St., New York City. April, 1931. 94 pp., 8½x11; charts and tables; paper.

THE business of grinding and distributing spices, although one of the less conspicuous branches of the food industries, did a business of $14,247,000 in 1930. This, however, is a decrease of 20 per cent from 1923. Per capita purchases of spices as such have dropped from 52 cents in 1924 to 40 cents in 1930, in which year only 1 cent was spent for spices for each $4.30 spent for food at retail. Because of the downward trend in volume and prices, the secretary of the association has surveyed the whole spice industry to determine trends, trade practices, opinions as to what is wrong and possible remedies, and the effect of competition of new methods of food processing, as well as newer methods of obtaining flavor.

One wishes that the report had dealt more fully with the effect of packaging, for the thought frequently occurs to a reader that the spice business also may possibly be suffering a volume decrease through the efficiency of the modern consumer spice package in preventing waste in the home. As a well-known mustard grinder once remarked, "It is not the mustard that people eat that makes me rich; it's what they leave on their plates."

Anyone desiring to know something of the economic status of the spice industry in the United States will find the report helpful.

A MARKET ANALYSIS OF THE RESTAURANT INDUSTRY. Prepared and published by The American Restaurant Magazine, 5 South Wabash Ave., Chicago, Ill. 1931. 62 pp., 8¾x11⅜; 70 illustrations; paper. Price, $5.00.

THIS BOOKLET prepared by the publishers of periodicals specializing in the industry devoted to serving meals to the public contains considerable data and graphic illustrations that should be of interest to the food industrialist. This material was obtained by means of a survey in which various departments of the U. S. Government, the whole restaurant industry and the manufacturers and distributors of equipment and supplies participated.

The food manufacturer may be surprised to know that the annual market for food products in the United States restaurant industry is estimated at 1⅛ billion dollars and that 22.26 per cent of all the money spent for food by consumers is spent for meals served in public eating places. The change in the eating habits of the American public during the past ten years has resulted in nearly 300 per cent increase in number of meal-serving places. These, approximately 120,000, eating places have an annual sale of more than 2½ billion dollars with less than 30 per cent of them doing 78 per cent of the business.

It is interesting to note that 45 per cent of the income of the restaurant industry is spent in the purchase of food supplies.

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THE AGRICULTURAL CRISIS, VOL. 1. Published by the Economic Committee, League of Nations, June 15, 1931. Distributed in the United States through American Agent, 40 Mount Vernon St., Boston, Mass. 322 pp. 8x10; paper. Price, $2.

THE Economic Committee has obtained exact information on the agricultural depression in the important countries of the world by questioning experts about the actual condition of their own countries. The report deals with facts which define the general aspect of the discouraging condition, and sets forth general and international truths which arose out of the meetings held by agricultural experts in January, 1930 and 1931. It is in four parts. The first part deals with general characteristics of the universal situation; the second discusses consumption, production, technical progress, disorganization caused by war, monetary fluctuation, and other factors which caused the upset; part three deals with market conditions in the principal branches of agricultural production. Included are statistical data on prices, consumption, area production, and stocks of cereals as well as livestock, dairy produce, and other food items for past years. The fourth part deals with the remedies and various measures proposed or suggested to handle the crisis.

The survey of the position of agriculture in the various countries includes statistics on farm prices of products, ratios of prices, farm populations, exports and imports, index numbers, production volumes, harvested acreage of crops, total earnings, and similar compilations of interest to producers and merchandisers of food products.

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INDEX TO THE LITERATURE OF FOOD INVESTIGATION—VOL. 3, No. 1. Compiled by Agnes Elizabeth Glennie. Published by the Food Investigation Board, 16 Old Queen St., Westminster, London, S.W. 1. March, 1931. 167 pp., 6x9⅝; paper. Price, 55 Cents.

THIS report of the Department of Scientific and Industrial Research is divided into fifteen sections dealing with such subjects as: Meat, Pig Flesh, Poultry and Game, Fish, Eggs, Dairy Produce, Fats and Oils, Fruit and Vegetables, Grain, Crops and Seeds, Theory of Canning, Theory of Freezing and Chilling, Bacteriology, Mycology, Engineering and Miscellaneous. Each section consists of divisions dealing with the various phases of the subject of the section and contains abstracts of the published work done on the subject throughout the world. A 3½-page bibliography of the periodical sources is included.

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FACTORS AFFECTING THE QUALITY OF COMMERCIAL CANNING PEAS. By C. B. Sayre, J. J. Willaman, and Z. I. Kertesz. Published by the New York State Agricultural Experiment Station, Geneva, N. Y. 76 pp., 5¾x8⅞; 37 tables; paper. No price given.

THIS technical bulletin, No. 176, published as of March, 1931, reports experiments to determine the chemical changes in peas that are associated with quality of the canned product. Detailed analyses show the variations in the organic and inorganic constituents of peas due to differences in fertilizer treatment, time of harvesting, variety, and enzyme action after shelling. Tenderness was the principal quality factor studied. All lots were canned under commercial conditions and the quality of the canned product was judged by canned foods.

These studies indicate that increased toughness, increased calcium in the seed coat, and enzymic changes take place in the peas if they are not canned within a few hours after shelling. They also show that potash fertilizers tend to make the peas more tender and that calcium makes the peas tougher.

This booklet contains a bibliography of the literature cited and should be of value to the canning technologist, especially one engaged in canning peas or supervising crop production for canning purposes.

PATENT DIGEST

Baking and Milling

Collapsible Paper Tray for Supporting Sliced Bread Before Being Sealed in a Wrapper—Charles H. Goodyear, Portland, Ore. No. 1,817,135. Aug. 4, 1931.

Sectional Baking Pan With Seated Water Coil for Baking Split Rolls—Maryan J. Hubert, Easthampton, Mass. No. 1,817,690. Aug. 4, 1931.

Doughnut Machine for Small Production—Herbert T. Hunter, Catonsville, Md., to Doughnut Machine Corp., New York City. No. 1,817,887. Aug. 4, 1931.

Cake Iced Mechanically by Means of a Rotating Table, Hopper, and Roller Operating in Timed Relation—John R. Litty, and Trued B. Lundin, Philadelphia, Pa. No. 1,818,412. Aug. 11, 1931.

Doughnuts Mechanically Coated in a Continuous Manner—Herbert T. Hunter, Catonsville, Md., to Doughnut Machinery Corp., New York City. No. 1,819,557. Aug. 18, 1931.

Doughnuts Proofed in Compartment Heated With Hot Vapors From Cooking Baths Before Entering Cooking Grease—Edward William Broeg, Chicago, Ill., to Doughnut Machine Corp., New York City. No. 1,821,689. Sept. 1, 1931.

Dough Mixed and Forced Through Cutting Device by Means of Screw Worm Conveyor—Ignacio Nuñez, San Luis Potosi, Mexico. No. 1,822,309. Sept. 8, 1931.

Macaroni and Other Alimentary Paste Products Dried by Passing in a Continuous Manner Through Chambers Into Which Air Is Forced Under Temperature Controlled Condition—Arthur W. Quiggle and Alexander S. T. Lagaard to the Creamette Co., Minneapolis, Minn. No. 1,822,313. Sept. 8, 1931.

Canning and Glass Packing

Combined Cooker and Cooler With a Non-Agitating Type of Can Transfer Apparatus—Albert R. Thompson to Anderson-Barngrover Mfg. Co., San Jose, Calif. Nos. 1,818,109 and 1,818,110. Aug. 11, 1931.

Food Products Sealed Under Vacuum After Container Has Been Removed From Vacuum Chamber—James H. O'Neil and Alfred L. Kronquest, Syracuse, N. Y., to Continental Can Co., Inc., New York City. No. 1,819,437. Aug. 18, 1931.

Brine-Supplying Attachment for Can Closing Machines—James H. O'Neil, Syracuse, N. Y., to Continental Can Co., Inc., New York City. No. 1,820,480. Aug. 25, 1931.

Can With Bent-In Edge to Which Vacuum May Be Applied Prior to the Sealing Operation in Vacuum Chamber—James H. O'Neil, Syracuse, N. Y., to Continental Can Co., Inc., New York City. No. 1,820,481. Aug. 25, 1931.

Can Feed Mechanism of Rotary Disk Type to Accelerate Rate of Feed—Henry L. Guenther, Los Angeles, Calif. No. 1,820,562. Aug. 25, 1931.

Second-Class Lever Type of Device for Removing Slip Cover Lids From Cans—George E. Mayhew to Swift & Co., Chicago, Ill. No. 1,820,575. Aug. 25, 1931.

Dairy and Egg Products

Rancidity-Resisting Butter Prepared by Washing and Treatment With Diacetyl—Cornelius B. Van Niel, Delft, Netherlands, to Naamloose Vennootschap, Rotterdam, Netherlands. No. 1,816,800. July 28, 1931.

Irradiating Milk Solids by Agitating the Particles and Spraying With Ultra-Violet Ray Without Development of Objectionable Odor and Flavor—George C. Supplee, Bainbridge, N. Y., to the Borden Co., New York City. No. 1,817,936. Aug. 11, 1931.

Egg Whites Dried so That Ripening Proceeds to a Determined Point Where Ripening Action Is Stopped—Albert K. Epstein and Benjamin R. Harris, Chicago, Ill. No. 1,818,212. Aug. 11, 1931.

Milk-Bottle Sterilizing Machine—James B. Baker, Scenery Hill, Pa. No. 1,813,602. July 7, 1931.

Hot Water and Steam Generator for Washing Milk Cans—Carl J. Bettger, Hereid, S. D. No. 1,813,605. July 7, 1931.

Milk Separator Attachment for Straining Milk Before It Enters Reservoir of Separator—Fernand Henrard, Brussels, Belgium, to Société Anonyme Écremeuses Melotte, Remicourt, Belgium. No. 1,820,800. Aug. 25, 1931.

Cheese Melted by Being Forced Through Tubes Fitted With Cylindrical Core and Surrounded by Hollow Chamber Adapted to Receive Heating Agents—Alexander Axelrod, Zurich, Switzerland. No. 1,820,900. Sept. 1, 1931.

Powdered Malted Milk Products Containing Fruit Material Possessing a Proteolytic Ferment—William Horlick, Jr., Racine, Wis. No. 1,813,574. July 7, 1931.

Fruits and Vegetables

Ripening of Bananas by Subjecting Fruit to Air, Gradually Increasing in Temperature and Humidity—Robert J. Broadbent, Marouhra Junction, New South Wales, Australia. No. 1,817,875. Aug. 4, 1931.

Apples Cored by Means of a Tubular Corer and a Cutter—Burton C. Coons, Rochester, N. Y., to Coons Machinery Corp., Gates, N. Y. No. 1,817,967. Aug. 11, 1931.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

Fumigator for Disinfecting Fruit and Other Perishable Products in Cars—Arthur Lafayette, Dinuba, Calif. No. 1,819,562. Aug. 18, 1931.

Edible Pineapple Recovered From Shell Waste by Scraping—Robert B. Taylor, to Hawaiian Canneries, Ltd., Kapaa, Hawaii. No. 1,819,575. Aug. 18, 1931.

Fresh Fruit and Vegetables Protected Against Normal Deterioration by Being Stored in Container Filled With Insert Gas After Removal of Atmospheric Air—Edward Milani, San Francisco, Calif. No. 1,821,166. Sept. 1, 1931.

Fruit Halving and Pitting Machine—Albert R. Thompson, San Jose, Calif., to Pacific Machinery Co., San Francisco, Calif. No. 1,822,180. Sept. 8, 1931.

General Equipment

Mixing Apparatus Comprising a Rotary Bladed Impeller and a Stationary Deflector—Henry S. Beers, Westport, Conn., to the Turbo-Mixer Corp., New York City. No. 1,816,562. July 28, 1931.

Tank Car Cleaning Apparatus Utilizing Water and Steam—Marshal E. Byerley, Big Spring, Tex. No. 1,816,953. Aug. 4, 1931.

Temperature Regulation for Carrying Out Chemical and Biological Processes at a Controlled Temperature—Henry F. Buhrig, Chicago, Ill., to Standard Brands, Inc., Dover, Del. No. 1,817,232. Aug. 4, 1931.

Food Products Frozen by Two-Surface Contact With Metal Belt Cooled by Being Sprayed With Refrigerant—Clarence Birdseye, Gloucester, Mass., to Frosted Foods Co., Dover, Del. No. 1,817,890. Aug. 4, 1931.

Truck Body Ventilator for Vehicles Having Separate Closed Body and Cab Compartments—William G. Mayer, Pittsburgh, Pa. No. 1,818,415. Aug. 11, 1931.

Labels Applied to Convex Surfaces as They Pass Through Horizontal Plane—Percival John Purdy, London, England. No. 1,819,263. Aug. 18, 1931.

Cold Storage Cooling Coils Defrosted by Circulation of Heated Brine—Edward F. Hedler, Williamsville, N. Y. No. 1,819,510. Aug. 18, 1931.

Air Cooled and Dried by Air Conditioning Systems—Walter L. Fleisher to the Cooling & Air Conditioning Corp., New York City. No. 1,819,643. Aug. 18, 1931.

Superposed Double-Unit Quick-Freezing Machine With Separate Feeding Means for Subjecting Different Sized Packaged Food Products to Freezing Temperatures on More Than One Surface and in a Closed, Continuously Operating System—Clarence Birdseye, Gloucester, Mass., to Frosted Foods Co., Inc., Dover, Del. No. 1,822,077. Sept. 8, 1931.

Food Products Subjected to Freezing Temperatures in Stationary Hollow Plate Machine Equipped With Brine Circulating Means for Refrigerating Plates—James J. Barry, Halifax, Nova Scotia, to Frosted Foods Co., Inc., Dover, Del. No. 1,822,121. Sept. 8, 1931.

A Multi-Plate Refrigerating Unit Equipped With Means For Freezing Food Products Between Plates—Clarence Birdseye, and Bicknell Hall, Gloucester, Mass., to Frosted Foods Co., Inc., Dover, Del. No. 1,822,123. Sept. 8, 1931.

Means of Refrigerating Conveyor Bands in Quick-Freezing Apparatus so That Refrigerating Medium Does Not Come in Contact With Package—Clarence Birdseye, Gloucester, Mass., to Frosted Foods Co., Inc., Dover, Del. No. 1,822,124. Sept. 8, 1931.

Controlled Distribution of Solid CO_2 Refrigerant Effects in Container Filled With Perishable Products—David H. Killeffer, Yonkers, N. Y., to Dryice Equipment Corp., New York City. No. 1,822,850. Sept. 8, 1931.

A Two-Stage Fan Unit for Air-Conditioning Purposes—Samuel M. Anderson to B. F. Sturtevant Co., Hyde Park, Mass. No. 1,813,692. July 7, 1931.

Meat Packing

Appearance of Carcass Improved for Marketing by Contracting Thorax Walls During Chilling—John Clifton Agar to Swift Co., Chicago, Ill. No. 1,817,541. Aug. 4, 1931.

Carcasses Cut Into Integral Parts by Circular Saw Operating Over a Traveling Conveyor—Clifford A. Dunseth, Kansas City, Mo. No. 1,817,678. Aug. 4, 1931.

Fish Washed and Brined in Tank Fitted With Continuous Conveyor Perforated to Permit Draining and Cleaning—James Joffree Barry, Gloucester, Mass., to Gloucester Foods Co., Inc., Dover, Del. No. 1,821,201. Sept. 1, 1931.

Forced Feed Attachment for Food Choppers and Grinders—John W. Kautzman, East Orange, N. J., and John H. Parker, Newark, N. J., to Saunders Mfg. Co., Newark, N. J. No. 1,821,344. Sept. 1, 1931.

A Two-Stage Continuous Process of Rendering Fat Containing Solid Materials—Stanley Hiller, Oakland, Calif. No. 1,821,639. Sept. 1, 1931.

Miscellaneous Processes

Method of Mixing Ingredients for Making Mayonnaise—Samuel B. Drucker, Brooklyn, N. Y. No. 1,820,909. Sept. 1, 1931. Apparatus patent No. 1,822,275. Sept. 8, 1931.

Beans and Peas Roasted in Continuous Manner by Being Passed Through a Series of Superposed Roasting Cylinders—Frank F. Clandrow, New York City. No. 1,820,938. Sept. 1, 1931.

Enzyme Solution Preserved by Addition of One-Half Per Cent by Weight of Pine Oil—Leo Wallerstein to Wallerstein Co., Inc., New York City. No. 1,820,957. Sept. 1, 1931.

Fish Meal Desiccated by Superheated Steam Without Development of Odor—David D. Peebles, Eureka, Calif., to M. E. Booth Co., Inc., San Francisco, Calif. No. 1,820,986. Sept. 1, 1931.

Green Coffee Berry Soaked in Fruit Acid Solutions and Dried Prior to Roasting—Daniel Joseph Kennedy, Vancouver, B. C., Canada. No. 1,821,551. Sept. 1, 1931.

Coffee Beans Freed From Chlorogenic Acid by Treatment With Water Vapor Under Pressure—Karl Lendrich to heirs-at-law of Karl Lendrich, Hamburg, Germany. No. 1,822,227. Sept. 8, 1931.

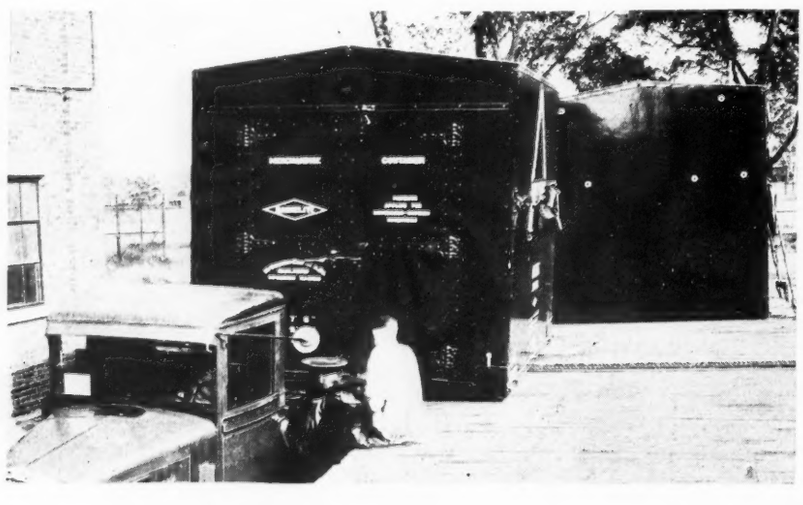
NEW EQUIPMENT FOR FOOD MANUFACTURERS

Shipping Container for Bin-to-Bin Delivery

ACTUAL bin-to-bin delivery of merchandise in large shipping containers without use of any crane equipment was recently demonstrated to a group of railroad officials at the plant of the Mt. Vernon Car Manufacturing Co., Mt. Vernon, Ill. The container consisted of a specially built car body of plywood construction. It was equipped with air-operated wheel jacks upon which the car body was raised or lowered. Two separate sets of wheels, acting at right angles to each other, made possible the moving of the container in any direction without the disadvantages of swivel wheels. When desired, the container was set directly on the platform or floor and, as when in transit, shifting was prevented by means of spring clamps.

A motor truck developed by the International Harvester Co. transported the body between distant points. This specially designed truck was equipped with a platform which could be elevated horizontally or tilted at a sharp angle. The platform was equipped with a power-driven winch which was used to move the car body on its own wheels. Four racks that elevate the platform were driven by power take-off and the truck was equipped with a small air compressor and air storage tank that operated the wheel jacks on the container.

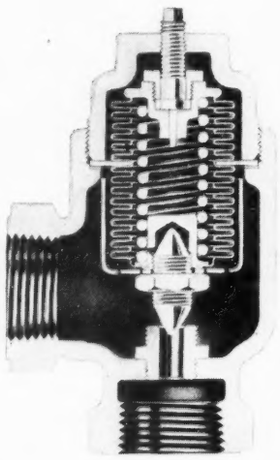
The car-body container is the invention of George R. Meyercord, a former president of the Illinois Manufacturers' Association, and is regarded as a means by which the railroads can fight motor-truck competition. Studies show that container shipping losses are less than 0.1 per cent, in contrast with an average of 4.5 per cent in box-car shipping. Furthermore, container shipping is said to reduce greatly the amount of necessary clerical work.



New Type Steam Trap

A TRAP designed to discharge condensate from a steam line at a temperature corresponding to a pressure below the operating steam pressure is being manufactured by the C. F. Tagliabue Manufacturing Co., Park and Nostrand Aves., Brooklyn, N. Y.

This trap may be placed in the steam line at any desired point and so adjusted by means of a differential setting screw in the top of the pressure regulating part of the trap that it will discharge condensate at a temperature corresponding in pressure to as much as 20 lb. less than the operating steam pressure regardless of whether the steam pressure is 50 or 150 lb. This is said to be accomplished without further adjustment of the differential setting.

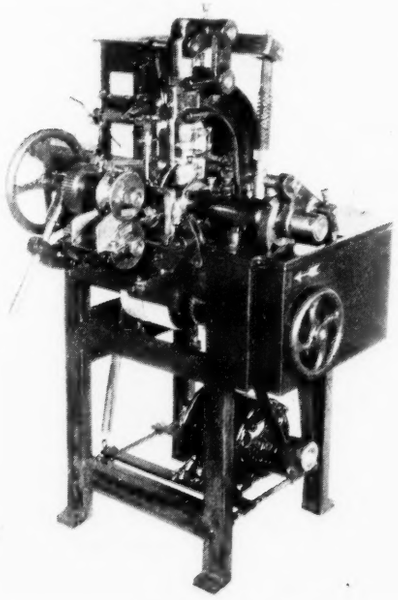


When there is no tension on the adjusting spring the trap will discharge condensate from 1 to 2 deg. F. below the temperature of the operating steam but when tension is put on the spring by turning down the setting screw a mechanical pressure is produced on the inside of the bronze bellows. This mechanical pressure aids the vapor pressure developed in the bellows to close the valve and determines whether the trap will close at the temperature of the operating steam or several degrees below the operating temperature.

The trap is equipped with reversible as well as renewable Monel seats and disks. It is manufactured in the 1-in. size only because it is felt that the full ⅞-in. valve opening gives ample capacity and permits easy interchangeability on every steam line.

Sucker Machine of Punch And Die Type

CUT-ROCK design suckers are made possible by the "Die Pop" machine which the Racine Confectioners' Machinery Co., Racine, Wis., has recently added to its line of confectionery manufacturing equipment. By means of this machine, sucker type of confections can be made so that each individual piece may contain more than one color and flavor. A variety of designs is provided for, in order that the piece may take the appearance of a flower blossom, with the outside and the center of different color and flavor.



In this unit the cooked sugar mass is fed directly into the mold and the stick is pushed into the molded form after the piece has taken definite shape, but before it has cooled. When the finished products are discharged from the machine they fall at evenly spaced intervals upon a delivery belt, which, if

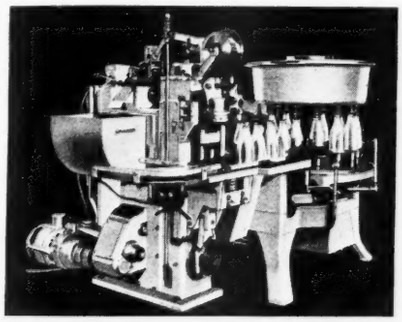
desired, will feed them into an automatic wrapping machine.

This machine, it is asserted, will produce 100 smooth and perfectly designed units per minute and, as shown in illustration, will take up floor space of $2\frac{1}{3} \times 2\frac{1}{3}$ ft. It weighs 800 lb., has a $\frac{1}{2}$-hp. motor, and requires but one person for operation.

Aluminum Milk Bottle Caps

FORMING caps from a ribbon of aluminum foil, the sealing machine recently developed by the Aluminum Seal Co., New Kensington, Pa., shows promise of lessening the problems of the dairyman.

Operation of this sealing machine is



so synchronized with that of the bottle-filling machine that the caps are made, embossed, and fitted securely onto the milk bottle as wanted. A specially designed bottle top, over which the aluminum cap is clamped, makes possible a secure sanitary seal which can be broken when desired by a twist of the wrist.

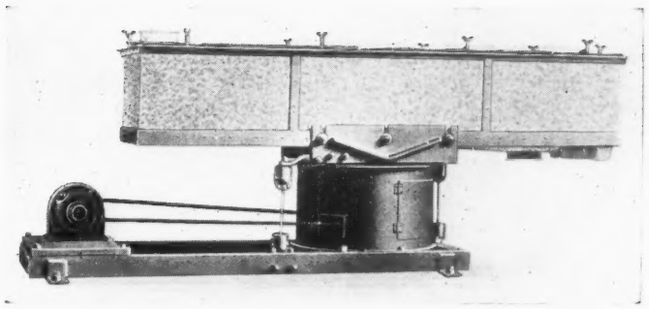
By this method of sealing, the depressed recess in the mouth of the milk bottle is eliminated and the double capping of the bottles with the resulting wire is made unnecessary, yet the contents of the bottles are protected fully against contamination and spillage.

Mechanical Sifter With Gyratory Action

DESIGNED to have every portion of the sieve box moving in a circular direction, the mechanical sifter recently added to the Wolf Co., Chambersburg, Pa., line of sifting equipment may operate through a horizontal or an inclined plane.

Rubber agitators attached to a subscreen under each sieve are constantly in motion when the sifter is in use to increase sifting action and to prevent the sieve from clogging at any point. Although the sieves may be inclined to have a pitch as much as $1\frac{1}{4}$ in. per ft. (6 deg.), most materials are reported to be handled effectively with the sieves practically horizontal.

The sieve box is said to move with a smooth, rhythmic motion, because an accurately proportioned combination of counterweights neutralizes all vibratory movements. Ball and roller bearings reduce friction. The sifter may be



equipped with two or more screens of same width and length made in nineteen sizes with from 1 to 96 sq.ft. of sieve surface.

As the materials enter the sieve box they begin to stratify, whereby the coarser particles are brought to the top of the mass and moved steadily to the tail end of the sieve. The finer particles move through the coarser material and pass through the sieves, to be collected in a receiving tray on the bottom of the sifter. In this way two to five separations can be made with one machine.

The sieves may be of silk or wire cloth and the sifters can be furnished with motor drive or ball-bearing countershaft for belt drive. They may be used for all kinds of sifting operations.

MANUFACTURERS' PUBLICATIONS

Acid-Resisting Pumps—A description of centrifugal pumps, No. 40 and self-priming pump No. 50, accompanied by a series of rating charts, is contained in bulletin No. 164, prepared by the Duriron Co., Inc., Dayton, Ohio.

Chemical Encyclopedia and Price List—Merck & Co., Inc., Rahway, N. J., have issued a quarterly price list for industrial chemicals and have published the fourth edition of Merck's Index, an encyclopedia for the chemist, pharmacist, and physician.

Air Conditioning—A unit cooler, incorporating fan-driven air circulation, frequent automatic defrosting, and liquid level control, has been announced by Grinnell Co., 250 West Exchange St., Providence, R. I.

Belt Drives—Seven types of positive drives for the transmission of power are described in an illustrated booklet by the Link Belt Co., 300 West Pershing Road, Chicago, Ill.

Refrigerated Cabinets—A series of new commercial cabinets manufactured by Seeger, St. Paul, Minn., is portrayed in a 64-page illustrative booklet.

Rubber Goods—A description of rubber goods, including rubber-lined pipes and tanks, mechanical and hard rubber goods, conveyor belting, hose, and similar products, is contained in an illustrated booklet issued by the B. F. Goodrich Rubber Co., Akron, Ohio.

Insect Control—A new national service for safeguarding foodstuffs from insect infestation is explained by the Guardite Corp., Chicago, Ill., in an illustrated 22-page booklet.

Steam Flow Measurement—A handbook of steam flow measurement, explaining the computation of steam flow by two different methods, has been prepared by the Foxboro Co., Foxboro, Mass.

Flow Meter—A description of an indicating instrument for measuring the flow of air, steam, oil, water, or other liquids and gases in pipe lines is contained in a leaflet released by the Meriam Co., 1947 West 112th St., Cleveland, Ohio.

Industrial Chemicals—A price list of chemicals manufactured by the Harshaw Chemical Co., Cleveland, Ohio, and a list of industries in which the products are used is contained in a 24-page leaflet.

Chemical Products—Fine chemical products, with brief descriptions of their properties and applications, are covered in a booklet published by the Seydel Chemical Co., Jersey City, N. J.

Leather Belting—The effect of belt tension on the cost of belting, together with a brief non-technical summary of all factors entering into belt costs, is contained in an illustrated 12-page booklet issued by the Chas. A. Schieren Co., 30 Ferry St., New York City.

Vacuum Fumigation—Necessity for control and methods of control by fumigation in the food industries are explained with the aid of diagrams and photographs in bulletin No. 111, issued by the J. P. Devine Manufacturing Co., Inc., Mt. Vernon, Ill.

Refrigerating Machinery—The design of the vertical twin-cylinder ammonia compressor is explained and illustrated in detail in bulletin No. 830, prepared by the Vilter Manufacturing Co., Milwaukee, Wis.

Commercial Truck Bodies—Mechanically refrigerated bodies, panel bodies, one- and two-unit bodies, stake bodies; express, heavy duty, and stock rack bodies are illustrated in a 50-page booklet of the Batavia Body Co., Inc., Batavia, Ill.

Humidifier—The features of the Bahnson humidifier and a series of facts about humidity are contained in a descriptive and illustrative booklet prepared by the Bahnson Co., Winston-Salem, N. C

Supersifter—Supersifter machines with 100 per cent circular motion, smooth movement, stratifying action, and other improved features, manufactured in sizes and types for every need, are described in a booklet issued by the Wolf Co., Chambersburg, Pa.

Generator Units—"Small Generator Units and Their Applications," a new 12-page publication identified as Circular 1908, has been announced by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

Process Equipment—A complete description of various types of process equipment is contained in a 48-page illustrated booklet issued by the F. J. Stokes Machine Co., Tabor Road, Olney P. O., Philadelphia, Pa.

Pneumatic Cleaning and Aerating System—A product for cleaning and aerating starch for the candy industry is diagrammatically explained in a leaflet prepared by the Wolf Co., Chambersburg, Pa.

Can Labeling and Casing Equipment—The qualities of the adjustable labeler, the electro caser, and the hand-pull caser are described by the Burt Machine Co., Baltimore, Md., in an illustrated leaflet.

Glass-Lined Mixer—Bulletin No. 733, issued by the Pfaudler Co., 89 East Ave., Rochester, N. Y., announces a new glass-lined brine-packing machine or syrup mixer, and contains a price list for Pfaudler products.

Automatic Can Sealer—A 10-page booklet, containing an illustrated description of the automatic can sealer, has been prepared by the Automatic Canning Device Co., Inc., 549 West Randolph St., Chicago, Ill.

Laboratory Equipment—A leaflet has been issued by the Laboratory Construction Co., 1113-1115 Homes St., Kansas City, Mo., describing laboratory utility carts which include a flash carrier cart, chemical cart, portable table, and a glassware cart.

Tray-Type Dryers—A description of tray-type dryers in small sizes for plant and laboratories, and of dryers for all material handled on trucks is contained in illustrated folders prepared by Proctor & Schwartz, Inc., Philadelphia, Pa.

Mixing Equipment—Vertical and horizontal mixers, swift working mixers, agitators, and outlets are described and illustrated in a 20-page booklet published by the Struthers-Mills Co., Warren, Pa.

NEWS OF THE MONTH

Exempt Some Foodstuffs In I.C.C. Rail Rate Plan

If—and it remains a large if—the Interstate Commerce Commission's freight rate plan is adopted, the major agricultural products, including grain, grain products, all livestock, and most fresh fruits except citrus fruits, will be exempt from increase. Citrus fruits, melons, fresh vegetables, dried vegetables, dried or evaporated fruits, peanuts, and other agricultural products not specified may be subject to an increase of 1c. per 100 lb. On all other commodities, the increase may be 2c. per 100 lb. Less-than-carload traffic for which class rates are assessed on a basis of not more than 175 miles will bear no increase, and for rates assessed on 175 to 250-mile hauls, it will be 1c. per 100 lb.

By the pooling arrangement, which ear-marks for roads that fail to meet actual interest charges the increase of $100,000,000 to $125,000,000 in revenues that the temporary freight rate advance is expected to produce, the Interstate Commerce Commission has pinned the railroads down to their word that maintenance of railroad credit was their only reason for seeking relief.

The specific increases on commodities of practically all descriptions except farm products will enable the roads to get by, but they will get nothing unless they demonstrate their good faith by agreeing by Dec. 1 to pool the gross proceeds derived from all rate increases for distribution among the carriers who fail to earn interest charges.

Limited to a maximum of 10 per cent and a term expiring March 31, 1933, the specific rate increases are conditionally authorized by the Commission to avoid impairment of the rail transportation system and to increase confidence at a time when "the distrust of railroad securities is rapidly gaining elements of panic."

Mayonnaise Manufacturers Gather at Chicago

Discussion of selling problems featured the program for the sixth annual convention of the Mayonnaise Manufacturers' Association, which opened at the Stevens Hotel in Chicago on Oct. 26. Following the president's annual message from William R. McKeldin, vice-president of Atmore & Son, Inc., Philadelphia, Pa., delegates listened to an analysis of the present business situation by Ralph E. Heilman, dean of the school of commerce at Northwestern University. A closed session on selling problems opened with an address by Sterling E. Peacock, vice-president of N. W. Ayer & Son, advertising agents.

A closed session also was held on manufacturing and buying problems, including a practical discussion of costs by L. Evert Landon, of Nalleys, Inc., Tacoma, Wash. The question of adding colors to mayonnaise came up for discussion under the leadership of C. E. Mench, Mench's Mayonnaise Products Co. The importance of knowing costs was treated at the open session on Tuesday morning by Homer J. Buckley, of the Buckley-Dement Co., Chicago.

The progress of the simplification problem and the activities of the standards and research committee were reviewed, and a paper on peroxide formation as a measure of the autoxidative deterioration of vegetable oils, part of the research program investigation, was given by D. H. Wheeler, assistant research fellow. Plans for participation of the association in the 1933 Chicago World's Fair came up for action at the meeting. The annual banquet took place on Oct. 27 at the Stevens Hotel.

Dairy Industries Exposition Opens at Atlantic City

A pertinent program centering about the necessity for reducing unit costs in all branches of the dairy industry is expected to attract to this year's meeting of dairy groups a registration equal to that established in other years. The exposition, to be held in the Municipal Auditorium on the Boardwalk at Atlantic City, opens Oct. 26, running concurrently with the annual convention of the International Association of Ice Cream Manufacturers, from Oct. 26 to 28, and that of the International Association of Milk Dealers, from Oct. 29 to 31. Dr. Julius Klein, Assistant Secretary of Commerce, will deliver the opening address.

The third annual meeting of dairy engineers, sponsored by the dairy engineering committee of the American Society of Agricultural Engineers, will be held at the Auditorium on Oct. 29. Technical sessions of this body, of general interest to many production men, will be open to members of other groups who care to attend. Headquarters for the ice cream group will be the Hotel Ambassador, and for the milk dealers the Chalfonte-Haddon Hall.

Other groups that will have exhibits at the resort during the convention period include the Evaporated Milk Association, the National Dairy Council, and the U. S. Bureau of Dairy Industry.

The students' national contest in judging dairy products, which has become one of the leading features of the meeting, will take place on Oct. 27. Six research scholarships will be awarded to the individual winners. The butter contest and exhibit, now in its fifth year as an outstanding event at the exposition, will be held as usual, with A. W. Rudnick, secretary of the National Creamery Buttermakers' Association, in charge. Prizes will be awarded for this event and for the cheese contest and exhibit, which was inaugurated at last year's exposition and proved highly popular. Indications are that all available exhibit space, covering a total area of some five acres, will be occupied by the equipment display.

Study Safety Measures For Food Plants

Practical ways and means for the reduction of accidents and accident costs in the food industries were discussed at three of the sectional meetings at the Twentieth Annual Safety Congress, held in Chicago, Ill., Oct. 12 to 16, by cooperating groups of the National Safety Council. In the food section, in which about 200 organizations are represented, specific problems of the canning industry, and manufacturing operations involving the dust explosion hazard, were high points in the discussion. Methods used to interest personnel in safety measures received considerable attention.

The refrigeration section, representing an industry in which accident rates have been disproportionately high, made a thorough analysis of some of the danger points. Indications are that firms in this group which have stressed safety have reduced both frequency and severity of accidents more than 25 per cent. An interesting paper at this session by D. H. Killifer, of the DryIce Corp. of America, pointed out that intelligent handling of dry-ice during the past five years has allayed fears that the product would cause widespread danger of frostbite, explosions, and possible suffocation.

The packers and tanners group, one of the pioneer cooperative sections, had three program sessions. Increased interest in safety work in this field is seen in the fact that 67 meat packing establishments reported their accident experience in 1930, as contrasted with 18 for the previous year. Eleven identical establishments during the past three years made a reduction of 51 per cent in accident frequency and 43 per cent in accident severity. However, the industry still has much to accomplish, as the 1930 frequency rate was almost twice that for industry in general. The causes responsible for this condition, and methods of combating them, were featured in the discussions.

Packers Seek Uniform Meat Inspection; Discuss Problems at New York

A CONCRETE plan to bring about uniform state inspection for meat packing plants not now under federal supervision was presented to members of the Institute of American Meat Packers who met at the Waldorf-Astoria Hotel in New York, Oct. 16 to 20. A result of two years' study by the commission of inspection of the institute, the plan calls for passage by Congress of a law giving federal aid, including half the cost of inspection, to states who shall put into effect a uniform meat inspection law.

Transportation or sale of meat or meat products that have not been inspected, or fail to meet the sanitary provisions set up under the act, will be a misdemeanor, punishable by fine and imprisonment. If the plan is fully carried out, all meat packing throughout the United States, with the exception of slaughtering one by farmers for their personal use, will be subject to the same kind of inspection now existing in federally inspected plants.

The plan was developed with the cooperation of non-members, as well as members, of the institute. Concerted action to bring about passage of the federal bill and group action in the various states was urged upon the delegates, and a resolution favoring the step was given unanimous approval.

Attendance and opinion at the convention showed a realization of the need for cooperation in view of the subnormal price levels now existing in the industry. Price competition has been unusually severe under present conditions, it was pointed out. C. B. Denman, of the Federal Farm Board's livestock division, indicated that further decreases in livestock prices are probable, particularly for hogs. In analyzing the needs of the industry, William Whitfield Woods, president of the institute, dwelt upon the fact that, although more adequate statistics are necessary, the industry has not yet taken full advantage of the information it now possesses. Citing the decrease in exports of pork and lard as one of the difficulties that the industry itself cannot control, he urged a "moratorium on selfishness" as a remedy of universal application.

Merchandising trends affecting the situation were discussed from the chain store viewpoint by T. A. Conners, national meat buyer for A. & P. The use of packaged individual cuts of meat is of questionable benefit, he held, and has not proved the panacea it was expected to be. Peter V. Bouterse, general manager of McCann & Co., Pittsburgh, Pa., told of merchandising from the individual dealer's standpoint.

The chemical research program of the institute was outlined by L. M. Tolman of Wilson & Co., Inc., with particular emphasis on the work on lard. Research made as part of the program in one case, he said, developed a method for testing stability of lard that eliminated the sale of certain unsuitable grades. He cited a study which showed that savings due to the proper use of hypochlorite, as developed under the program, were greater than the total cost of the institute's research work.

Representing the engineering and experimentation division of the institute's plant operating program, H. J. Koenig, of Armour & Co., told of the development of hog hair in quilted form as an insulant. The widening use of power-driven saws and automatic sausage-linking machinery was also brought out. S. C. Frazee, chairman of the packing house practice committee, told of the improvements in hide take-off being developed in cooperation with tanners. Methods of handling casings to eliminate odors and save ice, use of corrugated paper boxes, and improvements in conveying systems also were discussed.

Forty-five men who have been with the industry for 50 years or more were awarded gold buttons in recognition of their services. Award of more than 1,000 buttons to 25-year men was announced.

At the concluding sessions, officers for the coming year were elected. John W. Rath, Rath Packing Co., Waterloo, Iowa, is chairman of the board, succeeding F. S. Snyder, Batcheldor, Snyder, Dorr & Doe, Boston, whose resignation was accepted with general regret. W. W. Woods was reelected president.

Vice-chairmen carried over from the previous administration were: E. C. Cudahy, Jr., Chicago; B. C. Dickinson, Philadelphia; Jay C. Hormel, Austin, Minn.; Chester Newcomb, Cleveland, Ohio, and George A. Schmidt, New York City. Harold Meyer, of Cincinnati, succeeded Henry Neuhoff, Nashville, Tenn., as treasurer. Samuel Slotkin, president, Hy-Grade Food Products Corp., New York City, was added to the board of directors. Few changes were made in the central administrative committee, the governing body of the organization. Mr. Rath was appointed to succeed J. E. Decker, resigned, and T. J. Lee, president of Armour & Co., was appointed to succeed F. Edson White, former president of Armour & Co., and now deceased.

Following the convention proper, the institute joined with other groups on Oct. 21 for the Eighth Conference of Major Industries. A general review of the business situation, in which Arthur M. Hyde, U. S. Secretary of Agriculture, discussed the agricultural factors, was the theme of the conference. Nicholas Murray Butler, president of Columbia University, presided. The Friendship Dinner, with Frederic S. Snyder presiding, was held Wednesday evening. Speakers included General John J. Pershing, Field Marshal Sir William Robertson, F. W. von Prittwitz und Gaffron, German Ambassador to the United States, and Yukio Ozaki, prominent Japanese statesman.

COMING EVENTS

NOVEMBER

7-14—Pacific Slope Dairy Show, Oakland, Calif.
9-13—American Bottlers of Carbonated Beverages, Dallas, Texas. (Sessions at Dallas Municipal Auditorium.)
10-13—National Association of Practical Refrigeration Engineers, Rice Hotel, Houston, Texas.
17-20—National Association of Ice Industries, Gunter Hotel, San Antonio, Texas.
19-20—Associated Grocery Manufacturers of America, Inc., (Executive sessions only), Waldorf-Astoria Hotel, New York City.

DECEMBER

1—American Association of Creamery Butter Manufacturers, Palmer House, Chicago, Ill.
3—National Dairy Association, Palmer House, Chicago, Ill.

Consider Definitions for Milk and Rye Bread

A public hearing on the proposed definitions for milk bread and rye bread was held in Washington on Oct. 27 under sponsorship of the Food Standards Committee. The purpose of the hearing was to receive comment, both oral and written, from food and drug officials, the baking industry, and the public before giving the standards an accepted status. The definitions are:

MILK BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of flour, salt, yeast, and milk or its equivalent (milk solids and water in the proportions normal to milk); with or without edible fat or oil, sugar and/or other fermentable carbohydrate substance. It may also contain diastatic and/or proteolytic ferments, and such minute amounts of unobjectionable salts as serve solely as yeast nutrients.* The flour ingredient may include not more than 3 per cent of other edible farinaceous substance. Milk bread contains, one hour or more after baking, not more than 38 per cent of moisture.

RYE BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of rye flour, or of rye flour and a wheat flour, with water, salt, and yeast; with or without edible fat or oil, milk or a milk product, sugar and/or other fermentable carbohydrate substance. It may contain diastatic and/or proteolytic ferments, and such minute amounts of unobjectionable salts as serve solely as yeast nutrients.* The total flour ingredient, of which rye flour constitutes not less than one-third, may include not more than 3 per cent of other edible farinaceous substance. Rye bread contains, one hour or more after baking, not more than 38 per cent of moisture.

*The propriety of the use of minute quantities of oxidizing agents as enzyme activators is reserved for future consideration and without prejudice.

Canned Food Advertising Gets Under Way

The institutional advertising campaign sponsored by the National Canners' Association will begin in November and December issues of the leading women's magazines, according to a recent announcement. With a substantial sum definitely subscribed by its underwriters, the campaign will convey directly to millions of American homes the scientifically established facts about canned foods.

It is planned to make the campaign definitely educational in character, thus furnishing a background that will make more effective advertising of individual products in the canning industry. The campaign is being directed through a special committee representing those who subscribed to the advertising fund.

Exports of Dried Fruits Show 70 Per Cent Gain

Exports of raisins, dried apples, apricots, peaches, and prunes from the United States during the first eight months of 1931 totaled 233,668,324 lb., as compared with 137,437,251 lb. from January to August, inclusive, 1930, according to the Commerce Department's Foodstuffs Division.

This 70 per cent increase in export movement was principally accounted for by prunes, shipments of which increased from 62,749,457 lb. in the 1930 period to 133,174,574 lb. during the 1931 period, reflecting the large 1930 production of this item on the West Coast. Particularly in view of the smaller production of prunes on the West Coast forecast for the current season, this continued large export movement is a favorable factor in the prune market situation.

Average declared export values of these dried fruits, with the exception of raisins, declined, because of the large supplies available from the 1930 crops and in line with the general drop in commodity prices and existing economic conditions in the principal consuming markets. Prunes showed the greatest loss in average value, having been declared for export at 4.37c. per lb. average during the first eight months of 1931, as compared with 8c. during the same months of 1930. Raisins actually recorded an increase in average declared value, rising from 5.13c. per lb. in 1930 to 5.65c. during 1931.

Show Distribution Data For Meat, Poultry, Fish

Census of distribution statistics on the meat packing, fish canning, and poultry killing industries have been released by the Department of Commerce during the past few weeks. The information is summarized at the right in tabular form.

Table I—Distribution of Sales, 1929, of Plants in the Meat Packing Industry

	Selling Value (F.o.b. Factory)	Per Cent of Sales	Number of Plants Selling: Total	Exclusively as Indicated
Total	$3,454,980,000	100.0	1,274	..
Sales to manufacturers' own wholesale branches	1,621,521,000	46.9	234	32
Sales to manufacturers' own retail branches	35,053,000	1.0	173	23
Sales to dealers:				
Wholesalers	615,832,000	17.8	518	98
Retailers	1,057,026,000	30.6	915	353
Sales to consumers:				
Industrial and large (manufacturers of leather, candles, sausage casings, etc.; hotels, restaurants, etc.)	106,001,000	3.1	272	27
Household	19,547,000	0.6	172	38

Of the above sales to dealers and industrial consumers, $178,141,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 166 manufacturing plants, 24 of which sold their entire output in this way.

TABLE I-A—PLANTS WITH 1929 PRODUCTION OVER $10,000,000

Total	$2,296,166,000	100.0	75	..
Sales to manufacturers' own wholesale branches	1,449,799,000	63.1	66	8
Sales to manufacturers' own retail branches	1,543,000	0.1	7	..
Sales to dealers:				
Wholesalers	397,006,000	17.3	59	1
Retailers	399,350,000	17.4	41	..
Sales to industrial consumers	48,468,000	2.1	31	..

Of the above sales to dealers and industrial consumers, $119,992,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 30 manufacturing plants, 1 of which sold its entire output in this way.

TABLE I-B—PLANTS WITH 1929 PRODUCTION FROM $1,000,000 TO $10,000,000

Total	$896,542,000	100.0	298	..
Sales to manufacturers' own wholesale branches	161,467,000	18.0	97	7
Sales to manufacturers' own retail branches	22,470,000	2.5	39	1
Sales to dealers:				
Wholesalers	180,704,000	20.2	176	19
Retailers	475,354,000	53.0	231	53
Sales to consumers:				
Industrial	45,325,000	5.1	80	4
Household	11,222,000	1.2	27	..

Of the above sales to dealers and industrial consumers $49,207,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 78 manufacturing plants, 5 of which sold their entire output in this way.

TABLE I-C—PLANTS WITH 1929 PRODUCTION FROM $500,000 TO $1,000,000

Total	$135,746,000	100.0	183	..
Sales to manufacturers' own wholesale branches	4,995,000	3.7	19	2
Sales to manufacturers' own retail branches	2,565,000	1.9	21	1
Sales to dealers:				
Wholesalers	20,049,000	14.8	71	11
Retailers	101,936,000	75.1	159	70
Sales to consumers:				
Industrial	4,011,000	2.9	35	..
Household	2,190,000	1.6	17	1

Of the above sales to dealers and industrial consumers $5,300,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 23 manufacturing plants, 2 of which sold their entire output in this way.

TABLE I-D—PLANTS WITH 1929 PRODUCTION UNDER $500,000

Total	$126,526,000	100.0	718	..
Sales to manufacturers' own wholesale branches	5,260,000	4.2	52	15
Sales to manufacturers' own retail branches	8,475,000	6.7	106	21
Sales to dealers:				
Wholesalers	18,073,000	14.3	212	67
Retailers	80,386,000	63.5	484	230
Sales to consumers:				
Industrial	8,197,000	6.5	126	23
Household	6,135,000	4.8	128	37

Of the above sales to dealers and industrial consumers, $3,642,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 35 manufacturing plants, 16 of which sold their entire output in this way.

Table II—Distribution of Sales, 1929, by Plants in the Wholesale Poultry Killing, Dressing, and Packing Industry

Total	$142,030,000	100.0	485	..
Sales to manufacturers' own wholesale branches	47,132,000	33.2	199	47
Sales to manufacturers' own retail branches	1,398,000	1.0	18	6
Sales to dealers:				
Wholesale	67,196,000	47.3	250	126
Retail	20,163,000	14.2	182	40
Sales to consumers:				
Large consumers who buy at wholesale (hotels, restaurants, etc.)	4,121 000	2.9	44	9
Household	2,020,000	1.4	76	13

Of the above sales to dealers and large consumers who buy at wholesale, $13,172,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 46 plants, 21 of which sold their entire output in this way.

Table III—Distribution of Sales, 1929, by Plants in the Canned and Preserved Fish and Shellfish Industry

Total sales distributed by manufacturers reporting	$76,280,000	100.0	299	..
Sales to manufacturers' own wholesale branches	2,810,000	3.7	25	10
Sales to manufacturers' own retail branches	303,000	0.4	7	..
Sales to dealers:				
Wholesale	64,677,000	84.8	249	163
Retail	6,659,000	8.7	77	22
Sales to users:				
Industrial (manufacturers using fish oil, scales, meal, etc.)	1,530,000	2.0	33	11
Household	301,000	0.4	20	..

Of the above sales to dealers and industrial users $37,387,000 was made through manufacturers' agents selling agents, brokers and commission houses by 141 manufacturing plants, 99 of which sold their entire output in this way.

Container Simplification Makes Progress

A sufficient number of signed acceptances to insure general adoption by the industry of the simplification program for carbonated beverage bottles have now been received by the Bureau of Standards, according to an announcement on Sept. 17.

Simplification plans for mayonnaise jars (see FOOD INDUSTRIES, August, 1931, page 361) and fiberboard shipping cases for canned fruits and vegetables, recently approved by conferences of interested parties, are now awaiting signed acceptance by a sufficient number of users and manufacturers to insure success of the program. It is planned to put both these recommendations into effect on Jan. 1, 1932, if the response justifies the step. Bureau of Standards officials are urging prompt action of interested parties in this respect.

May Ban Loose Milk In New York City

Whether retail sale of loose milk in New York City is to be prohibited rests to a large extent with the decision of the Loose Milk Commission, which has been holding hearings on the question for the past several weeks. Agitation to ban loose milk followed newspaper revelations alleging that more than 40 per cent of samples tested gave positive *B. coli* indication.

The health issue involved has been obscured to a large extent in later hearings by economic considerations, as loose milk has been sold regularly at 5c. less per quart than bottled milk. Civic organizations have contended that a reduction in the price of bottled milk should accompany elimination of the cheaper product, if milk consumption among the poorer residents, now the largest users of loose milk, is to be maintained. Sheffield Farms, Inc., and Borden's Farm Products Co., who handle practically all of New York's bottled milk, both maintain that no decrease in price is contemplated or possible.

The City Affairs Committee, in urging that bottling be made compulsory, has held that sale of milk should be a public utility subject to price regulation.

Prison Cannery Will Aid Colorado Needy

A unique plan to provide the jobless with food during the winter has been put in operation at the state penitentiary at Cañon City, Colo. The prison canning factory is placed at the disposal of communities contributing raw materials suitable for canning, the finished products to be distributed among unemployed in the districts making such donations.

A recent run at the canning factory, operated by convicts, placed a considerable quantity of foodstuffs in tin for the benefit of Cañon City's needy. Cost, according to members of the State Prison Board who are fostering the idea, will be less than one cent per can. This expense was borne by the Cañon City Chamber of Commerce. Stock growers and farmers made available a small herd of cattle and large quantities of vegetables and fruits. As a result, the penitentiary canning plant is in process of turning out 1,000 gal. of apple butter and several thousand cans of beans, beef, and vegetables.

Crop Estimates Show Changes From Last Year's Totals

First forecast of the 1931 Florida orange crop, released on Oct. 10 by the U. S. Bureau of Agricultural Economics, puts the estimate at 16,000,000 boxes, 3,000,000 boxes below the final estimate of the 1930 crop. The grapefruit estimate for 1931 is put at 12,000,000, boxes, compared to a final estimate of 16,000,000 boxes for 1930.

The Florida shipping crop for 1930, excluding that utilized in juicing plants and other processing, amounted to 16,000,000 boxes of oranges and 11,200,000 boxes of grapefruit, according to the report. The present season is later than last, and while some insect damage is reported, the crop as a whole is doing well.

Condition of the California 1931 orange crop is put at 78 per cent on Oct. 1. This compares to a figure of 85 per cent last year, but is approximately the same as the 1920-29 ten-year average. First estimates of the size of the California crop will be made in December.

The Oct. 1 estimate of the 1931 peach crop is set at 77,931,000 bu., which is close to early season expectations and about 41 per cent above the 1925-29 average. The low prices resulting from this, the largest crop on record, led to great waste, the report points out, but also to an exceptional amount of home canning.

One of the largest crops of apples in recent years, 36 per cent above last year and 28 per cent above the previous 5-year average, is forecast on Oct. 1. The estimate is 222,707,000 bu. The commercial crop, estimated at 113,000,000 bu., is 16 per cent larger than the 1925-29 average, despite the large amount of abandonment expected.

Production of tomatoes for manufacture is expected to amount to 1,056,300 tons, or 42 per cent less than last year. Among other canning crops, beets are indicated at 41 per cent below 1930 production, but green lima beans are expected to turn out only slightly less than a year ago.

The production of cranberries in the five principal producing states is forecast at 640,360 bbl., which would be about 14 per cent more than the 1930 production and 10 per cent more than the average for the five years preceding. The forecast for Massachusetts is 445,000 bbl.; for New Jersey, 138,000 bbl.; for Wisconsin, 43,000 bbl.; for Washington, 9,360 bbl.; and 5,000 bbl. for Oregon.

Recent reports from growers indicate that the commercial acreage of strawberries for harvest in 1932 will be 22 per cent larger than last year.

Business Conditions Remain Unsettled

A continued low level of activity characterized business activities during the past month and still appears to dominate the situation.

Wholesale and retail prices turned their course downward, as did employment and payroll totals in all manufacturing industries except confectionery. A weighted price index for food has shown up-and-down movements since Sept. 26.

Wholesale food prices declined 1.09 per cent between Aug. 15 and Sept. 15 for a total decline of 18.27 per cent for the 12-month period. This decline is in contrast with 1.56 per cent decrease in average price for all commodities during the month period and 17.93 per cent during the year.

A decrease of 0.33 per cent in average retail prices for food was registered in 51 cities for the month ending Sept. 15, making a total decline of 18 per cent for the year. An average increase of 5 per cent in food prices since Sept. 26 is shown by a weighted price index. However, during the past week this index has had a downward trend.

Due to the 20.95-per cent rise in employment totals and 38-per cent improvement in payroll totals in the confectionery division, the employment totals in the food group became greater by 2.06 per cent and payroll totals by 0.71 per cent for the month ending Sept. 15. This showing is in comparison with decreases of 0.57 per cent in employment totals and of 5.3 per cent in payroll totals of all manufacturing industries.

Elsewhere in the food group the baking division showed no change. All others showed decreases, ice cream being the one hardest hit, with decreases of 7 and 6 per cent in employment and payroll totals, respectively.

A shrinkage of 3.09 per cent in dollar sales for the four-week period ending Sept. 26 has been reported by a national food retail organization. Its tonnage sales increased 11.42 per cent for the same period.

General business conditions as of the middle of October are reported by *The Business Week* to be 70.2 per cent of normal. The index stood at 72.2 per cent for the last week of September.

TRADE NOTES

ANHEUSER-BUSCH, INC., St. Louis, Mo., has recently begun operations at its new yeast manufacturing plant at Old Bridge, N. J.

BEATRICE CREAMERY CO. has lately acquired the outstanding minority interest in the Chicago Cold Storage Warehouse Co., and the latter organization now becomes a wholly-owned subsidiary.

BUFFALO ROCK-ORANGE CRUSH BOTTLING CO., Miami, Fla., has recently opened a new plant for manufacture of an orange beverage containing true fruit constituents. W. A. Anthony is president of the Miami organization.

CRACKER JACK CO., Chicago, Ill., has introduced a new five-cent package of popping corn, known as "Pop It." Sales tests show an excellent prospect for the new product, it is reported.

FRANK M. FIROR, INC., is now manufacturing meat products at a newly equipped plant at First Ave. and 33d St., New York City. Frank M. Firor, president of the new organization, was formerly president of Adolf Gobel, Inc., New York City. F. Howard Firor is in charge of production at the plant and Norman C. Plaatche is in charge of sales.

GENERAL MILLS, INC., is now making the third major increase in the capacity of its packaged cereal plant at South Chicago. The expansion of this branch of the organization follows nation-wide promotional effort to popularize its packaged cereal.

HILLS BROTHERS CO., New York City, announced the arrival on Oct. 18 from the Persian Gulf of the S.S. "Kohistan" with a $2,000,000 cargo of new crop dates. The trip was made in the record breaking time of 27 days.

KOLTER-BUCKEYE DAIRY CO., Lima, Ohio, has been formed by the merger of Graham-Kolter Co. and Buckeye Dairy Co.

KROGER GROCERY & BAKING CO., Cincinnati, Ohio, will expand its manufacturing operations in Cincinnati and St. Louis. Facilities for manufacture of salad dressings, candy, peanut butter, and packing of olives, spices, and extracts will be set up in Cincinnati. At St. Louis, a 9,000-lb.-per-hour bread and cake bakery will be built.

MACON CREAMERY, Macon, Miss., has undergone a reorganization following purchase of controlling interest from E. V. Yates, former president. Edward F. Hardin, formerly manager, is now president and general manager; E. T. George is vice-president; B. F. Cox, secretary and treasurer; and W. E. Hickman, superintendent.

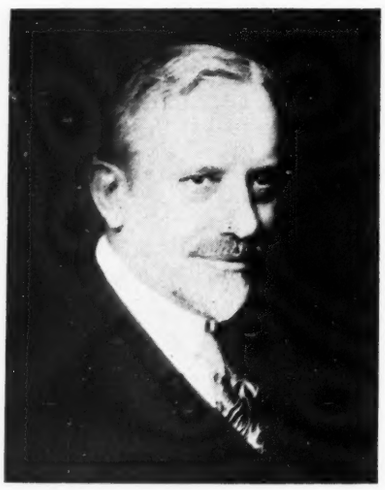
MANHEIM FARMS, INC., Utica, N. Y., has been organized to supplant the Manheim Dairy Co. The Dairymen's League Cooperative Association controls 51 per cent of the stock in the new organization as a result of the realignment. Harold Marriott, New Milford, Conn., is now manager of the plant.

MARTIN ORCHARD CO., Sturgeon Bay, Wis., is now marketing cherry juice. The juice is preserved by freezing in enameled cans of half-gallon capacity.

MICHIGAN ALKALI CO., Wyandotte, Mich., manufacturer of solid carbon dioxide, has completed arrangements with PURE CARBONIC, INC., controlled by Air Reduction Co., Inc., whereby Pure Carbonic, Inc., will sell and distribute this product nationally. The manufacturing facilities of the Michigan Alkali Co. are being expanded, increasing the daily capacity from 25 tons to 150 tons.

NATIONAL DAIRY PRODUCTS CORP. has arranged to acquire the Baker-Tabor Ice Cream Co., Cleveland, Ohio, it was recently announced.

PACIFIC SALMON SALES CORP., Seattle, Wash., has been organized by twelve of the large salmon canning companies in the Pacific Northwest to handle marketing problems for this product.



H. E. Barnard

RADIO COOKING CLUB, INC., Baltimore, Md., a cooperative promotional agency which will conduct cooking schools and radio broadcasts, began a tour of twenty cities in Reading, Pa., on Oct. 20. The companies promoting the club are: Armour & Co.; Borden Sales Co., Inc.; General Baking Co.; C. F. Mueller Co.; My-T-Fine Corp.; National Sugar Refining Co.; Standard Brands, Inc.; McCormick & Co., Inc.; Kelvinator Sales Corp.; and Standard Gas Equipment Corp.

SAFETY REFRIGERATION, INC., recently moved its general headquarters from New York City to 80 East Jackson Blvd., Chicago, Ill.

SINGER BAKING CO., INC., Staunton, Va., has recently been granted a charter by the State Corporation Commission. John L. Singer of Staunton, is president.

UTAH POULTRY PRODUCERS' COOPERATIVE ASSOCIATION and KALIN BROS. & CO., Los Angeles, Calif., packers and distributors of frozen eggs, have completed negotiations for establishment of a large frozen-egg industry in Salt Lake City, Utah. Under the agreement, eggs will be broken, canned, and frozen in Salt Lake City and distributed throughout the Northwest. It is expected that from one to two million pounds of egg meat will be packed in this manner.

WALKER-GORDON LABORATORIES, a subsidiary of the Borden Co., are now promoting the sale of "vitamin" milk in the New York area. The milk has a high anti-rachitic vitamin D potency, resulting from feeding the cows a special irradiated ration.

PERSONAL

H. E. BARNARD, for eight years head of the Institute of Baking of the American Bakers' Association, has been appointed director of the newly organized Corn Industries Research Foundation. Sponsored by the leading manufacturers of corn products, the foundation will seek to develop new markets and wider utilization, particularly in the industrial field. For a long period Dr. Barnard was Food Commissioner of the State of Indiana, and he was the author of the model Indiana Sanitary Food Law, afterward enacted in more than 40 other states. In 1929, he organized the White House Conference on Child Health and Protection at the request of President Hoover, and is still in charge of this work.

A. E. BARNES, for the past 23 years secretary of the Fruit Growers Supply Co., Los Angeles, Calif., and assistant general manager since 1928, has been appointed general manager of the organization. Mr. Barnes succeeds E. G. Dezzel. The Fruit Growers Supply Co. is the cooperative buying organization of the California Fruit Growers' Exchange.

WILEY BLAIR, JR., has been elected president of the Holly Sugar Corp., to succeed the late A. E. Carlton. Mr. Blair was formerly vice-president and chief assistant to Mr. Carlton.

MARION D. COULTER has been appointed a fellow of the Mellon Institute of Industrial Research, Pittsburgh, Pa., to carry on research on moisture-proof and greaseproof paper board for use in cartons and boxes. The fellowship is sponsored by the Robert Gair Co., New York City.

N. FUAD, a technical director of the Applied Sugar Laboratories, New York City, is now in Europe making a survey of recent developments in food and allied industries.

MARCUS J. GRAY, Boston, Mass., was elected president of the International Apple Association at its recent convention at West Baden, Ind.

HAROLD GROUT, formerly superintendent of the Marysville (Ohio) plant of Nestles Food Products, Inc., has been made Canadian sales manager of the organization.

ROY IRVIN, since 1917 a fellow at the Mellon Institute of Industrial Research on food and nutritional problems, will conduct a comprehensive investigation of the chemistry and technology of yeast, under an industrial fellowship established at the institute by the

National Grain Yeast Corp., Belleville, N. J.

GEORGE JANDA has recently been placed in charge of the canned food department of Hygrade Food Products Co. at Chicago. The company recently took over the Sullivan Packing Co. plant at Detroit, and has moved the canned foods activities of that organization to its Chicago plant.

JAMES L. KARLOVEC is now manager of the Columbus (Ohio) branch of Widlar Products Co., a Standard Brands unit. He was formerly manager of the Widlar branch at Akron, Ohio.

ALLEN O. MCGINNIS, formerly assistant district sales manager at the Pittsburgh office of General Foods Co., has been transferred to New York City, where he will become assistant to James F. Brownlee, vice-president of the General Foods Sales Co., Inc.

THOMAS H. MCINNERNEY, president of the National Dairy Products Corp. and William Fellows Morgan, Jr., of the Brooklyn Bridge Freezing & Cold Storage Co., New York City, have been appointed divisional chairmen of the commerce and industry division of the Emergency Unemployment Relief Committee. Mr. McInnerney will head the activities of the food products trade and Mr. Morgan the activities of the cold-storage warehouses in the division.

WILLIAM J. MONAGHAN has been made general sales manager of the ice cream division of the Borden Co. in the New York area. Sales activities of the Anheuser-Busch, Dairy Maid, Horton, Reid and Ricciardi divisions will be centralized under his direction. Mr. Monaghan was formerly in charge of Anheuser-Busch ice cream sales in New York, and joined the Borden Co. when it absorbed the Anheuser-Busch ice cream activities in this district. H. J. DIRKES succeeds Mr. Monaghan with the latter division.

L. A. PRIDGEON, until recently chemical engineer for the Diamond Crystal Salt Co., St. Clair, Mich., has been made plant superintendent of the Certo Division, General Foods Corp., Fairport, N. Y.

NOBEL RITCHEY, who has been at Krimskaya, U.S.S.R., as consultant for Soyuzkonserve, the Soviet fruit and vegetable preserving trust, recently returned to the United States.

J. W. SCHMALZ, until recently sales manager of Diamond Crystal Salt Co., has been placed in charge of Maxwell House tea sales. Maxwell House tea production will continue under the direction of GEORGE F. MITCHELL.

FRANKLIN E. SMITH, Boston, Mass., was recently elected president of the Cape Cod Cranberry Growers' Association. Other officers chosen were: First vice-president, JOHN J. BERTOM; second vice president, BERTRAM RYDER; secretary, LEMUEL C. HALL; treasurer, Z. H. JENKINS; and directors, the above officers and J. C. MAKEPEACE, MARCUS L. URANN, J. FRANKLIN; L. B. R. BARKER; E. E. ELDRIDGE and PAUL E. THOMPSON.

PERRY L. SMITHERS was elected president of Booth Fisheries Co., Chicago, Ill., at its annual meeting held several weeks ago. He has served as vice-president and general manager for 15 years. K. L. AMES, retiring president, was made chairman of the board of directors, a newly created position.

ROBERT E. SULLIVAN has resigned as secretary of the Bakery Sales Promotion Association to do special sales promotion work for the Continental Baking Corp.

N. O. TRIBBLE and VIRGIL MCDANIEL have been appointed to fill vacancies in the drug control unit of the Federal Food and Drug Administration. The vacancies were caused by recent resignations of Drs. J. J. Dorritt and G. E. Clarke. Dr. Tribble has previously been engaged in medical practice in Atlanta, and Dr. McDaniel has been employed by the U. S. Public Health Service.

W. R. TUCKER, formerly agricultural development agent for the Atlanta, Birmingham, and Coast Railroad, Atlanta, Ga., has taken an executive position with Icebound Products, Inc., a corporation which plans the production of a variety of frozen food products. Mr. Tucker was one of those instrumental in the development of quick-freezing of Georgia peaches.

S. H. ZIMMERMAN has been made superintendent of the Diamond Crystal Salt Co., St. Clair, Mich., according to an announcement by General Foods Corp. Mr. Zimmerman was transferred from the Calumet Chemical Co., Joliet, Ill., another General Foods subsidiary, where he held a similar position. He is succeeded at the Calumet plant by R. S. Dixon, formerly his assistant.

OBITUARY

HENRY C. BOHACK, president of the H. C. Bohack Co., Inc., which operates 740 chain stores in Brooklyn, N. Y., and near-by territory, died suddenly a few weeks ago. He was also a director of the National Food Products Corp., a holding company, and a number of other financial groups. Mr. Bohack was born in Germany and opened his first store in New York City in 1885. At the time of his death he was 66 years of age.

ALBERT E. CARLTON, president of the Holly Sugar Corp., died at his home near Colorado Springs, Colo., after a brief illness. He was 65 years old. The Holly Corp. is the second largest producer of beet sugar in the United States, owning and operating ten sugar factories with a combined beet slicing capacity of more than 12,500 tons per day.

EUGENE H. DALY, assistant sales manager of the J. M. Horton Ice Cream Co., died recently at his home in Brooklyn, N. Y. He was born in Brooklyn 53 years ago.

MORTIMER B. FULLER, president of the International Salt Co., died at his home at Dalton, Pa., Sept. 7, after an illness of more than a year. He was 54 years old.

HERMAN JACOBWITZ, president of Alexander Grossman & Co., New York City, butter and egg subsidiary of National Dairy Products Corp., died on Oct. 20 at Galesburg, Ill. He was taken from a train at this point while on his way to Omaha several weeks ago when he suffered a heart attack. Mr. Jacobwitz was 54 years old.

JOHN LABONTE, employed by the Arbuckle Sugar Refining Co. for 24 years, died in New York on Sept. 11. During the past three years he was raw sugar buyer for the organization.

SIR THOMAS LIPTON, internationally known tea merchant and yachtsman, died in London on Oct. 3, at the age of 81. In addition to the tea company, Sir Thomas at one time headed two meat packing plants in the United States, the Thomas J. Lipton Co. and the Cork Packing Co. Both of these, like the tea company, were organized to supply provisions to his chain of retail stores in Great Britain. They were later sold to the Cudahy Packing Co. At the Dinner to Industrial Pioneers, sponsored by the Institute of American Meat Packers in 1928, Sir Thomas was a guest of honor.

JOHN FRASER SMITH, for more than 37 years an employee of Swift & Co., Chicago, Ill., died Sept. 11 at his home in Chicago. Since 1901, he had been head of the refinery department of the Swift organization.

J. H. SUMME, president of the Summe-Ratermann Dairy Co., Cincinnati, Ohio, died on Oct. 6. Mr. Summe was born in Germany 76 years ago, and came to this country in 1884.

BUCHARD THOENS, consulting engineer, well known in the sugar and refrigeration industries, died recently at his home in New York City. He designed many of the sugar mills used in Louisiana and Texas in the early years of the century. Buchard M. Thoens, assistant treasurer of the Borden's Farm Products Co., New York, is one of the late Mr. Thoens' three surviving sons.

LUCIUS L. VAN SLYKE, for 38 years head of the division of chemistry at the New York State Agricultural Experiment Station, Geneva, N. Y., died on Sept. 30. In addition to his work as head of the inspection analysis laboratory at the experiment station, Dr. Van Slyke made important contributions to the chemistry of milk and dairy products, particularly cheese. He also served as professor of dairy chemistry at Cornell University. Dr. Van Slyke joined the experiment station in 1890, retiring in 1928. He was 72 years of age.

WILLIAM H. WATTIS, president and general manager of the Utah-Idaho Sugar Co., Salt Lake City, Utah, died in San Francisco, Calif., on Sept. 13. Mr. Wattis was also president of Six Companies, Inc., which holds the contract for construction of Hoover Dam on the Colorado River.

WILLIAM ZINSMASTER, founder of the Des Moines Bakery Co., died Sept. 7 at his home in Des Moines, Iowa. He was 89 years of age.

NEW CONSTRUCTION

Bakery — Joseph Boruta, 103 Halstead St., Wallington, N. J., awarded contract for the construction of a 2 story, 75 x 75 ft. bakery, stores and garage at Wallington Ave. and Mercer St. to Fred Gembala, 12 Van Buren St., Passaic. Estimated cost $40,000.

Bakery — Hathaway Baking Co., Elm St., Waltham, Mass., awarded contract for addition and alterations to bakery at Benefit and Elm Sts., to Hardy & Streeter, 153 Upland Road, Cambridge. Estimated cost $40,000.

Bakery—Kroger Grocery & Baking Co., 1311 South 39th St., St. Louis, Mo., is having preliminary plans prepared for a 4 story, 85 x 130 ft. bakery . Estimated cost $500,000. Emil H. Niemann, 3816 Shaw Ave., St. Louis, is architect. Equipment including mixers, traveling ovens, etc., will be required.

Bakery—Treasury Dept., Office of Supervising Architect, Washington, D. C., will receive bids until Nov. 12 for a group of buildings including bakery and storehouse building, kitchen, auditorium building, boiler house, laundry, etc., at Springfield, Mo.

Bakery—Wade Investment Co., Jacksonville, Fla., awarded contract for a bakery and warehouse to C. H. Hornstein, 2756 Park St., Jacksonville. Estimated cost $100,000. Great Atlantic & Pacific Tea Co., 420 Lexington Ave., New York, N. Y., is lessee. Estimated cost $100,000.

Bottling Plant—Coca Cola Co. of Canada Ltd., 90 Broadview Ave., Toronto, Ont., awarded contract for a 1 story, 50 x 60 ft. factory at Algoma and Queen Sts., Port Arthur to Alex Beck, 347 Cornwall Ave., Port Arthur. Equipment will be required.

Bottling Plant — Jaham Realty Corp., 57 Mangin St., New York, N. Y., will receive bids late in December for alterations to soda water bottling plant and garage. Estimated cost $20,000. William I. Hohauser, 17 West 44th St., New York, is architect.

Bottling Plant—Kaplan Bros., 146 Knowlton St., Bridgeport, Conn., plans the construction of a 2 story addition to bottling plant. Estimated cost $40,000. C. F. Davis, 1024 Main St., Bridgeport, is architect.

Bottling Plant — San Antonio Coca Cola Bottling Works, c/o O. L. and A. M. Beidenharn, La Fitte St., San Antonio, Tex., is having surveys made for the construction of a bottling plant, garage, etc. Private plans. Equipment will be required.

Canning Plant—C. H. Baxter & Bros. Co., Main St., Brunswick, Me., plans to rebuild canning plant at Westminster, Vt., destroyed by fire. Estimated cost to exceed $50,000. Architect not selected.

Canning Plant (Vegetable)—J. B. Chilton, Jr., Encinal, Tex., plans the construction of a canning plant at Encinal, also at Laredo. Estimated cost $40,000. Private plans.

Creamery — Bellows Falls Co-Operative Creamery, Bellows Falls, Vt., awarded contract for the construction of a 3 story, 45 x 100 ft. creamery to Roby Construction Co., 1103 Main St., Manchester, N. H. Estimated cost $40,000.

Creamery—Fort Jones Creamery & Meat Co., Yreka, Calif., awarded contract for a creamery to C. M. Potter, Yreka. $15,000.

Creamery Plant—Knowlton Creamery, c/o S. E. Knowlton, 1415 West Summit Ave., San Antonio, Tex., plans a 2 story, 90 x 140 ft. creamery plant on Fredericksburg Road. Estimated cost $60,000. Private plans. Equipment will be required.

Dairy Plant—Miller Bros., 925 Evergreen Road, Millvale, Pa., awarded contract for a 1 and 2 story, 32 x 84 ft. dairy plant to Richard L. Steirheim, 6 Reel Ave., West View, Pa. Estimated cost $40,000.

Milk Plant (Condensed) — Condensed Milk Co., 714 Union Title Bldg., Sheridan, Ind., awarded contract for a 3 story, 75 x 130 ft. condensed milk plant to T. A. Moynahan Co., 710 Union Title Bldg., Indianapolis. Estimated cost $40,000.

Freezing Plant—Frozen Juice Corp., c/o B. F. Pitman, Harlingen, Tex., plans the construction of a 1 story quick freezing plant, 3,000 gal. capacity. Private plans. Equipment will be required.

Cold Storage Warehouse—Atlas Warehouse & Cold Storage Co., E. R. Fisher, Mgr., Green Bay, Wis., awarded contract for a 4 story, 50 x 90 ft. warehouse to Jacob C. Basten, 1857 Willow St., Green Bay. Estimated cost $40,000.

Ice and Cold Storage Plant—Community Ice & Produce Co., E. L. Ashcroft, Sulphur Springs, Tex., will soon award contract for the construction of a 2 story ice and cold storage plant, 30 ton daily capacity at 5th and Denison Sts., Muskogee, Okla. Estimated cost $50,000.

Ice and Cold Storage Plant—George E. Wells, Inc., Little Rock, Ark., will soon award contract for the construction of an ice and cold storage plant, 60 ton daily capacity, at Cerokee and Fond du Lac Sts., Muskogee, Okla. Estimated cost $125,000.

Ice Manufacturing Plant — George Bruning, 178-15 93rd Ave., Queens Village, N. Y., plans the construction of a 73 x 148 ft. ice manufacturing plant at Rockaway Blvd. and 234th St., Rockaway. Estimated cost $50,000. Private plans.

Ice Manufacturing Plant—Dry Refrigeration Inc., San Bernardino, Calif., completed plans for a dry ice manufacturing plant near San Bernardino. Estimated cost $150,000. Stone & Webster Engineering Corp., 601 West 5th St., Los Angeles, is engineer.

Pre-Cooling Plant—San Gabriel Valley Pre-Cooling & Ice Corp., Covina, Calif., is having plans prepared for a 2 story, 100 x 325 ft. pre-cooling plant, including ice storage room, 4,000 ton capacity. Estimated cost $300,000. Gay Engineering Corp., 2650 Santa Fe Ave., Los Angeles, is engineer.

Pre-Cooling Plant — State Board of Harbor Commissioners, Ferry Bldg., San Francisco, Calif., is having plans prepared for addition to pre-cooling plant at China Basin. Estimated cost $500,000. F. G. White, Ferry Bldg., San Francisco, is engineer.

Pre-Cooling Plant—Upland Citrus Association, Upland, Calif., is having plans prepared for the construction of a pre-cooling plant. Estimated cost $65,000. W. W. Ache, 1616 4th Ave., Los Angeles, is architect.

Carrot Processing Plant — Carrot Products Corp. of Delaware, c/o J. A. Smith, Kingsville, Tex., awarded contract for the construction of a plant at Kingsville for the manufacture of marmalade, jellies, etc., from carrots, 9,000 tons annual capacity, to Aiken T. Vermesh, San Antonio. Estimated cost $115,000.

Cheese Plant—Kraft-Phenix Cheese Corp., 400 Rush St., Chicago, Ill., and Denison, Tex., c/o A. J. Riddle, is having preliminary plans prepared for a 1 story cheese plant including equipment at Anson, Tex.

Food Manufacturing Plant—Kroger Grocery & Baking Co., 35 East 7th St., Cincinnati, O., will soon award contract for the construction of addition to plant for making salads and peanut butter, coffee roasting, etc. Estimated cost to exceed $250,000. Packaging, roasting, conveying and other equipment will be purchased.

Grocery Warehouse — Greenspan Bros., 226 Washington St., Perth Amboy, N. J., is having revised preliminary plans prepared for a 1 story, 260 x 460 x 165 ft. grocery warehouse at Fayette St., Perth Amboy. Estimated cost $300,000. Ballinger & Co., 12th and Chestnut Sts., Philadelphia, Pa., are architects.

Rice Terminal—City of Beaumont, Tex., will soon start work on a municipal rice terminal and storage plant. Estimated cost $60,000. Conveying and other equipment will be required.

Grain Elevator—Albany Port District Commission, c/o P. G. Ten Eyck, Chn., Albany, N. Y., awarded contract for the construction of a grain elevator, 2,000,000 bu. capacity to Stewart Corp., 343 South Dearborn St., Chicago, Ill. Estimated cost $1,497,235.

Packing Plant—Keefe-LeStourgeons Co., R. T. Keefe, Pres., Arkansas City, Kan., will build a 3 story, 60 x 125 ft. addition to packing plant, including refrigeration equipment, etc. Estimated cost $40,000. E. Moore, Arkansas City, is architect. Work will be done by local labor.

Packing Plant—Kuhner Packing Co., Muncie, Ind., awarded contract for a 2 story, 73 x 133 ft. packing plant at North Elm and 13th Sts., to George Hitchens, Muncie. Estimated cost $65,000.

Packing Plant — Limoneira Co., 117 North 10th St., Santa Paula, Calif., is receiving bids for a 1 story packing plant. Estimated cost $70,000. R. C. Wilson, 112 South Mills St., Santa Paula, is architect.

Packing Plant—Lovett & Kirk, West Rowson St., San Benito, Tex., will soon award contract for a 1 story, 40 x 120 ft. packing plant at Southern Pacific right-of-way, Brownsville. Private plans.

Packing Plant—John Morris Jr., 322 North Commerce St., Harlingen, Tex., will soon award contract for a 1 and 2 story, 60 x 128 ft. packing plant including eight coloring rooms, storage rooms, etc., on West Jackson St. Private plans.

Packing Plant—Southern Pacific Co., c/o P. Shoup, Pres., 65 Market St., San Francisco, Calif., will soon receive bids for the construction of a 1 story packing plant at Brownsville, Tex. G. W. Boschke, San Francisco, is chief engineer.

Packing Plant Addition—Sieloff Packing Co., 4329 Natural Bridge Ave., St. Louis, Mo., postponed taking of bids for a 3 story, 80 x 175 ft. addition to packing plant at Natural Bridge Ave. Wedemeyer & Nelson, 824 Wainwright Bldg., and Bonnell-Tohntz Co., 1515 North Grand Blvd., St. Louis, are associate architects.

Packing Plant (Fruit and Vegetable)—A. O. Kolberg, Main St., McAllen, Tex., will soon award contract for the construction of a fruit and vegetable packing plant at Alamo. Estimated cost $25,000. Private plans. Alamo Fruit & Vegeable Exchange, lessee.

Packing Plant (Orange)—Highland Orange Association, Highland, Calif., awarded contract for a 1 story, 90 x 130 ft. packing plant to Gordon Donald, 50 East Vinde St., Redlands. Estimated cost $60,000.

Packing Plants—Rio Grande Vegetable Co-Operative Association, c/o R. Hartness, McAllen, Tex., will receive bids about Nov. 1 for the construction of packing plants at McAllen, Edcouch, Edinburg and Primera. Private plans.

Packing Plant (Meat)—Albert Packing Co., George Albert, Cecil, Pa., awarded contract for the construction of a meat packing plant at Jefferson Ave. and 4th St., Washington, to R. M. Day, 250 Donan Ave., Washington. Estimated cost $40,000.

Packing Plant (Meat)—Rognes Bros., Madison, S. D., will soon start work on superstructure of a 1 story meat packing plant. Estimated cost $35,000.

Packing Plant (Poultry and Egg) — Pacific Co-Operative Poultry Producers, 361 East Washington St., Portland, Ore., will build a poultry and egg packing and storage plant at Roseburg. Estimated cost $25,000. Work will be done by local labor. Equipment will be required.

Produce Plant—Fort Worth Poultry & Egg Co., 719 East 9th St., Fort Worth, Tex., is having preliminary plans prepared for a 1 story, 40 x 120 ft. produce plant including refrigeration room at Lampasas. Private plans.

Stock, Dairy and Poultry Feed Plant—G. E. Conkey Co., 6529 Broadway, Cleveland, O., plans the construction of a stock, dairy and poultry feed plant at Hollywood near Memphis, Tenn. Estimated cost $200,000.

Leading Canners use...

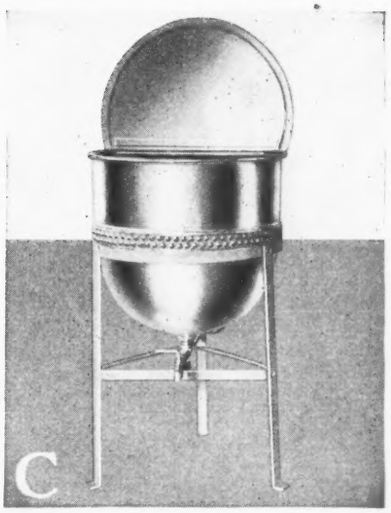
leading kettle manufacturers supply

Pure Nickel

Processing equipment...

IN modern canneries everywhere Pure Nickel has come to be regarded as practically indispensable for many types of processing operations. Tomatoes — soups — macaroni — meats — cranberries — jams — pineapples — cherries — dates — milk — these and many other foods are now regularly processed in Nickel.

This trend has been given increased momentum by leading manufacturers of canning equipment who have standardized on Nickel for many of their products. For example, many types of jacketed kettles formerly made of other materials are now regularly constructed of Nickel.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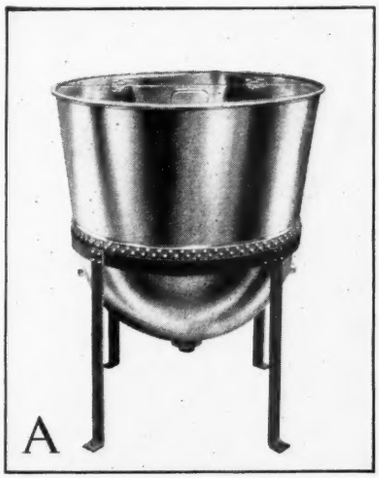
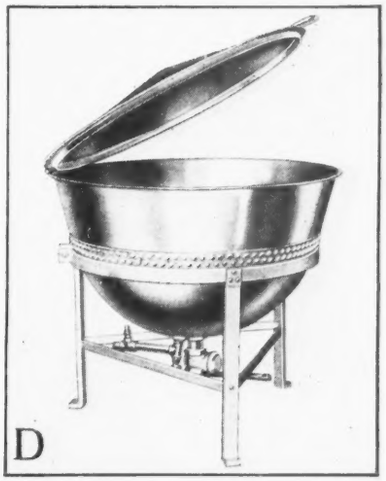

A

Canners find that Pure Nickel solves their equipment problem because it is both rustproof and highly resistant to the corrosive action of most food and fruit acids. It protects the product against contamination, and promotes natural flavor. Nickel's glass-smooth, non-porous surface will not retain stale odors and can be kept scrupulously clean with minimum cleaning effort. Strong as steel, with no coating or plating to crack or wear off, Nickel equipment retains its silvery, inviting appearance through years of hardest service and cuts repair expense to the bone.

Insist upon Nickel when you install new canning equipment—and send for "Modern Ideas in Food Plant Sanitation," a valuable booklet that will give you a new conception of Nickel's usefulness.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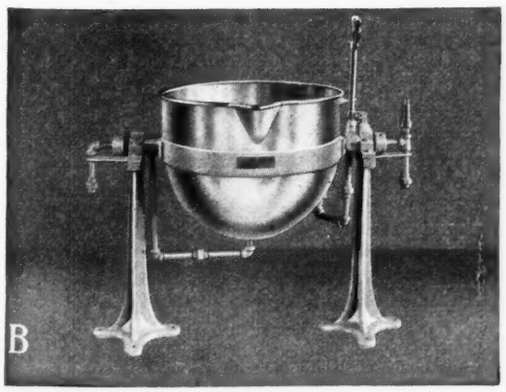

B

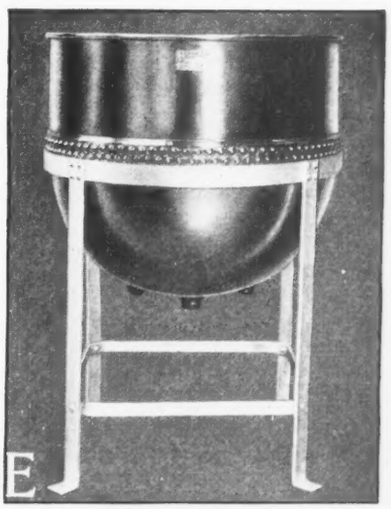
A—200-gal. seamless steam jacketed Nickel kettle, with hinged cover, as made by B. H. HUBBERT & SON, Baltimore, Md.

B—New type of Pure Nickel trunnion kettle as made by LEE METAL PRODUCTS Co., Philipsburg, Pa.

C—60-gal. Pure Nickel steam jacketed kettle as made by BUCYRUS COPPER KETTLE WORKS, Bucyrus, Ohio.

D—140-gal. steam jacketed Nickel kettle, with counterweighted hinged covers and quick opening Nickel valves, made by SHOLES, INC., New York, N. Y.

E—60-gal. all Nickel steam jacketed kettle, manufactured by B. H. HUBBERT & SON, Baltimore, Md.

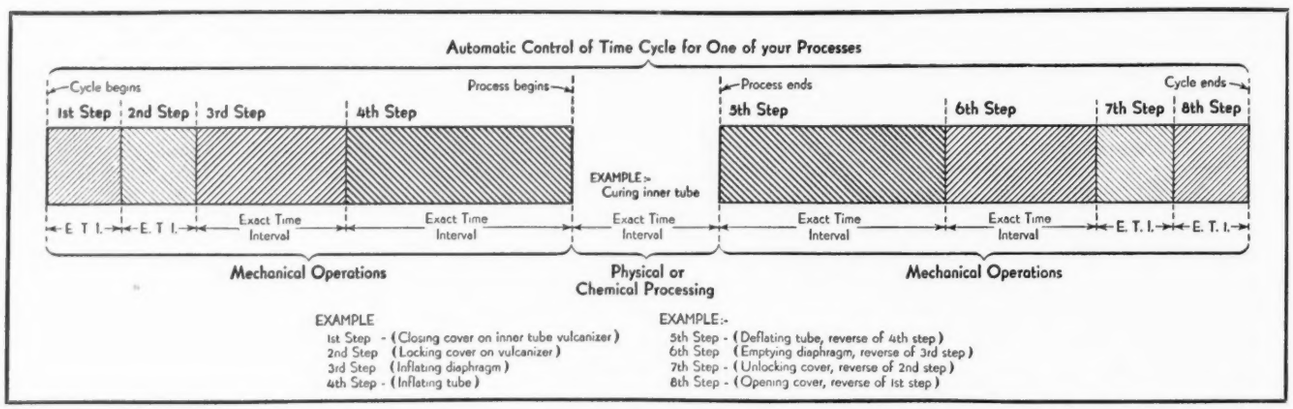

E

Nickel

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Each Step in a Process Cycle *on time, every time*

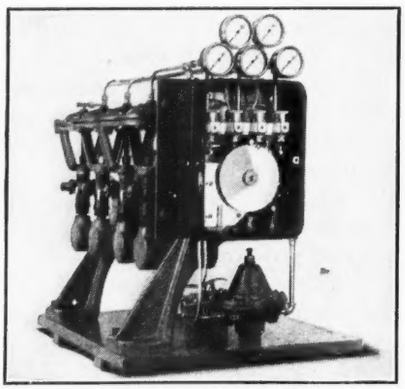
BRISTOL'S new Process Time Cycle Controller automatically regulates mechanical operations on an exact time schedule....



Diagrammatic illustration of the control made possible by a single-cam instrument, recommended for processes in which the several steps and their sequence towards the end of a cycle are the reverse of those at the beginning of the cycle.

THE evils and losses of uncontrolled production operations are widely recognized. Industries are busily engaged in an effort to develop methods for supplanting those "rule-of-thumb" practices that still obtain in only too many operations. Now, more than ever before, management realizes the vital necessity of the closest control of production methods and operations.

Each step in a process cycle should be performed on time all the time. The starting, stopping and duration of every operation should be carried out in strict accord with a prescribed schedule. To make this ideal theory a practical, workable fact, BRISTOL has developed and perfected a



BRISTOL'S Process Time Cycle Controller

Process Time Cycle Controller which makes possible automatic regulation on a predetermined time basis.

It is used and endorsed by prominent concerns in the rubber and food industries. It provides precision time control of the several steps in any cycle in which governing mechanisms can be made to respond, in a definite sequence, to diaphragm valves or other devices actuated by compressed air.

The possible applications of this new BRISTOL'S Process Time Cycle Controller are almost without end. An audit of your own production methods by one of BRISTOL'S Application Engineers may reveal many opportunities for standardizing quality, assuring uniformity of product, lessening rejects or effecting comparable economies.

An inquiry incurs no obligation other than the granting of an interview to see whether our engineers may be of service.

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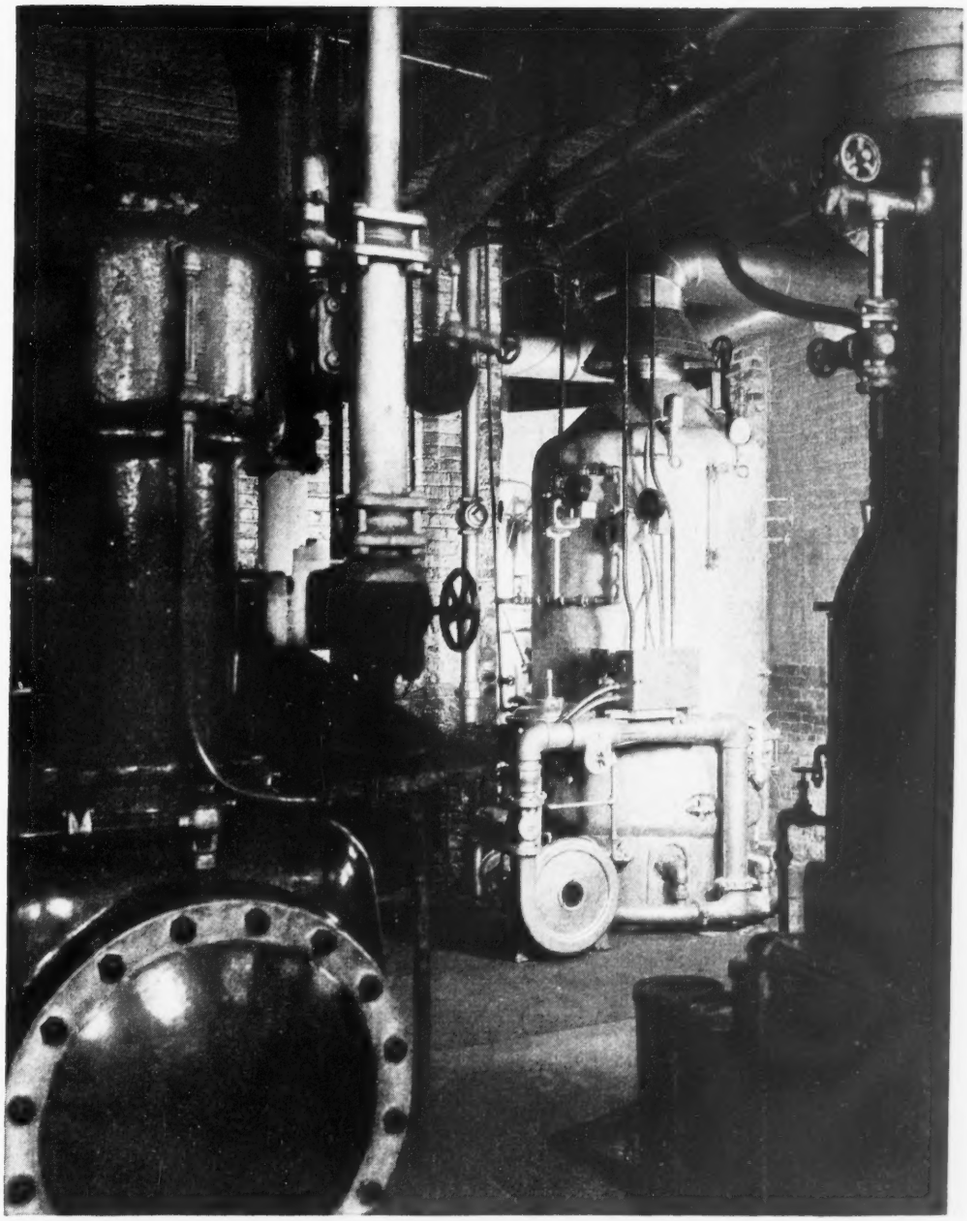
PROCESS TIME CYCLE CONTROLLER

GAS FOR HEAT
WHEREVER HEAT
IS NEEDED . . .



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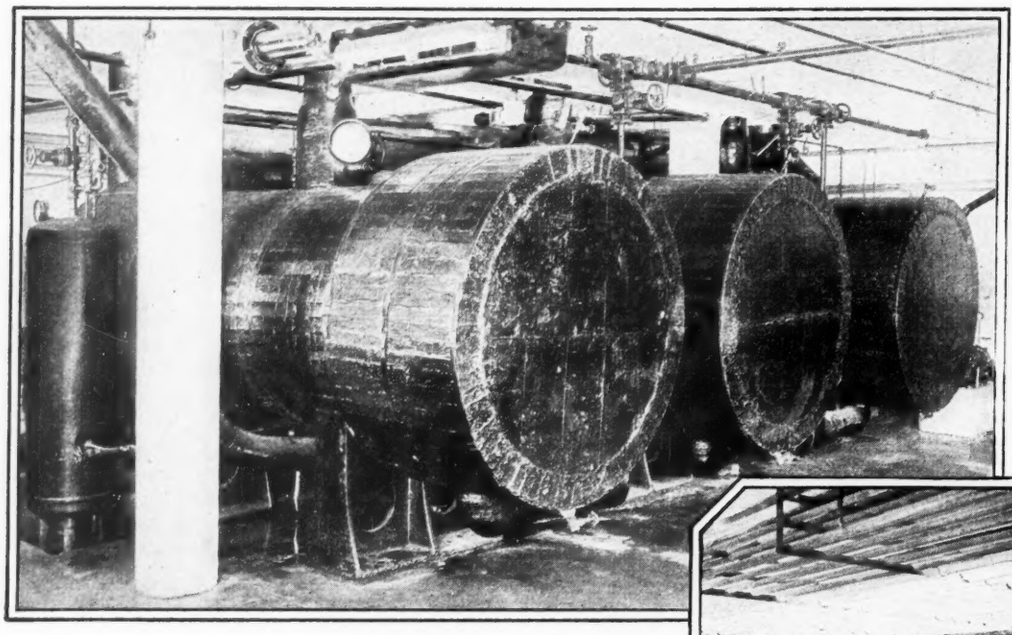
AMERICAN *Gas* ASSOCIATION

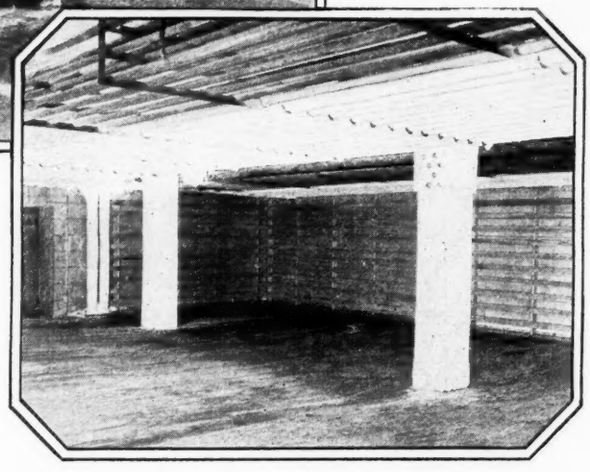
420 Lexington Avenue, New York

GUESS *how many years ago* these coolers were insulated...

[EVEN IF YOU KNOW CORK, THE ANSWER MAY SURPRISE YOU!!]



WHO SAYS CORK DOESN'T LAST? *Memphis Cold Storage Warehouse Company says it does—and points to these brine coolers, whose Armstrong's Insulation shows no deterioration after many years.*



THERE'S ANOTHER LONG RECORD *for cork in the walls and ceilings of this freezer room of the Memphis Cold Storage Warehouse Company, insulated with 6" and 8" of Armstrong's Corkboard*

THESE three brine coolers of the Memphis Cold Storage Warehouse Company, in Memphis, Tennessee, are insulated with Armstrong's Cork Lagging, 8" thick. The two in the foreground were covered *in May*, 1912,—the third in June, 1917!

You'd never guess the age of this insulation by looking at it. What's more, any kind of check will show it to be as efficient today as when it was installed. Cork, properly applied, doesn't deteriorate in service. That's why Armstrong's Corkboard has been standard insulation in cold storage work for thirty years.

Any number of refrigeration engineers will give you unbiased facts and figures on corkboard's performance. For instance, ask Mr. Charles A. Conley, Chief Engineer of the Memphis company. He'll tell you about the years of good insulation service cork has given in this plant—on brine coolers and cold lines, and in the walls of freezer and storage rooms.

It will pay you to specify "Armstrong's Insulation." Unexcelled engineering and research facilities enable Armstrong to keep always a step ahead in production methods. Armstrong's nation-wide planning and erection service assures correct installation and guarantees maximum insulation life.

We'd like to tell you all about Armstrong service and Armstrong products. Just write for descriptive literature and samples. Armstrong Cork & Insulation Co., 948 Concord Street, Lancaster, Pa.; Canadian offices in Montreal, Toronto, and Winnipeg.

Armstrong's (A) *Product*

Armstrong's Corkboard and Cork Covering

FOR ALL COLD ROOMS AND COLD LINES

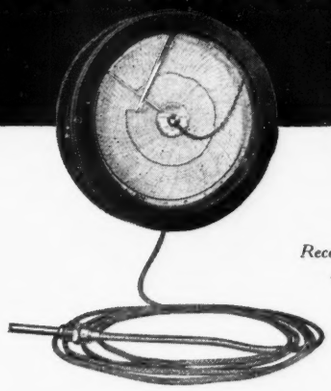
LOWER

your manufacturing

COSTS

with Motoco Recording

THERMOMETERS



Recording Thermometer Model "1000"

TEMPERATURE records are vital to the full efficiency of your manufacturing operations. Savings in waste — and thus lower manufacturing costs — invariable results from the installation of the *right kind* of temperature equipment.

Motoco Recording Thermometers provide this important temperature control. Out of an experience of over 20 years' manufacture of fine instruments comes the new Model "1000", a precision recording instrument of the wall-mounted type. An instrument of startling simplicity — unequalled for sensitivity, steadiness under vibration and all-around dependability and sturdiness. Standard graduation between the limits of minus 40 and plus 750 degrees Fahrenheit, or the equivalent in Centigrade. Fully compensated for pressure and temperature. Capillary tubing — available in lengths up to 50 feet — is armor-protected, extremely flexible, durable and unaffected by moisture.

Entire movement is enclosed in a molded composition case that is dust-, fume- and moisture-proof. Electric clock movement, instead of standard mechanical movement, available at slight extra cost.

Our engineers will welcome the opportunity to discuss your temperature control problems. Without obligation on your part, of course.

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Plants at TOLEDO, OHIO; LA CROSSE, WISCONSIN; in CANADA, AUSTRALIA, ENGLAND, FRANCE and GERMANY

"Saves At Least 15% of Coal!"

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"It is well worth the consideration of any factory which has hot water going into the sewer, as it saves at least 15% of coal."

A Morehead system in your plant:

1. **Will give you *immediate* and *thorough* drainage of all steam-heated equipment.**
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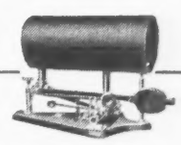

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Continental's specialists in package design offer you a service that has for years played an important part in many of the country's outstanding merchandising successes.

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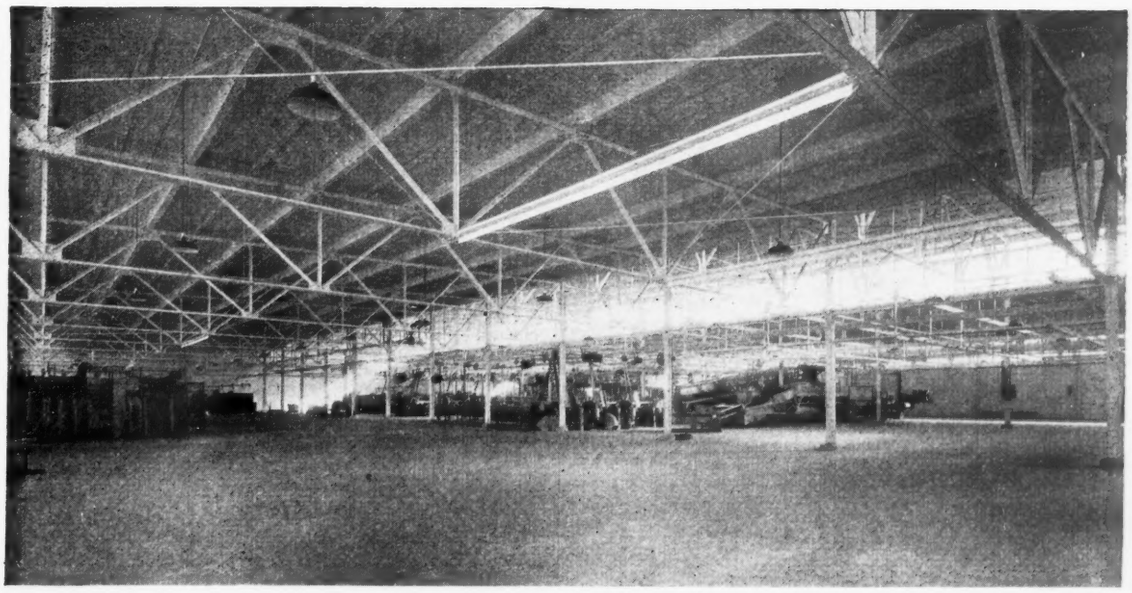

Cutler-Lobingier Packing Company's plant at Oakland, Calif. Designed, built and equipped by Austin.

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Austin Engineers have helped many a manufacturer to operate profitably—even at fractional capacity—by providing flexible straight-line layouts.

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In these times no one can afford to overlook possible opportunities. The value of the outside viewpoint cannot be overestimated. Why not grant Austin a brief interview which may bring you ideas that will have an important bearing on your business NOW and for years to come? Use the memo below to get "The Return Trip to Profits," a brief discussion of ways and means.

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MEMO TO THE AUSTIN COMPANY, CLEVELAND: ☐ Our Door is Open to New Ideas! ☐ Send us "The Return Trip to Profits!" ☐ We are interested in a ..... project of approximately ..... sq. ft.

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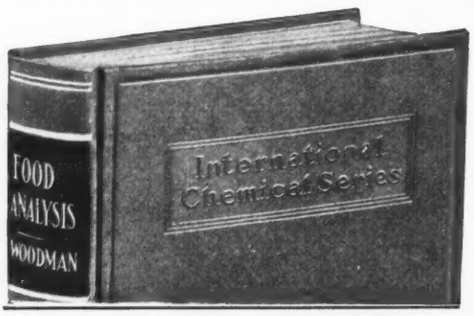

Food Analysis

Typical Methods and the Interpretation of Results

By A. G. WOODMAN

Associate Professor of Chemistry of Foods, Massachusetts Institute of Technology

557 pages, 5½ x 8, 110 illustrations, $3.50

IN THIS book the author has selected a variety of food materials calculated to illustrate the important methods of attack and the characteristic methods of analysis. Three classes of foods —fats and oils, carbohydrate foods and alcoholic beverages—have been treated at some length; general methods, common to the group, being taken up first in each case, followed by a more detailed discussion of several typical examples. The detection and identification of artificial colors has been treated fully.

In this third edition all data have been brought thoroughly up-to-date. Some of the methods have been changed to conform to the advances initiated by the referees of the Association of Official Agricultural Chemists.

Special emphasis is given to the importance of the interpretation drawn from the results of analysis.

Chapter Headings

1. General Methods. 2. The Microscopical Examination of Foods. 3. Food Colors and Preservatives. Chemical Preservatives. 4. Milk and Cream. 5. Edible Fats and Oils. Olive Oil. Butter. 6. Carbonydrate Foods. Maple Sirup. Honey. 7. Cocoa and Chocolate. 8. Spices. Pepper. Cassia and Cinnamon. Cloves. Mustard. 9. Cider Vinegar. 10. Flavoring Extracts: Extract of Vanilla. Lemon Extract. Extract of Ginger. 11. Alcoholic Foods. Wine. Whiskey.

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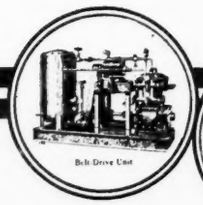
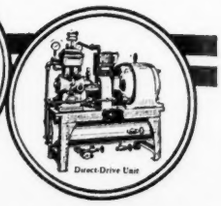
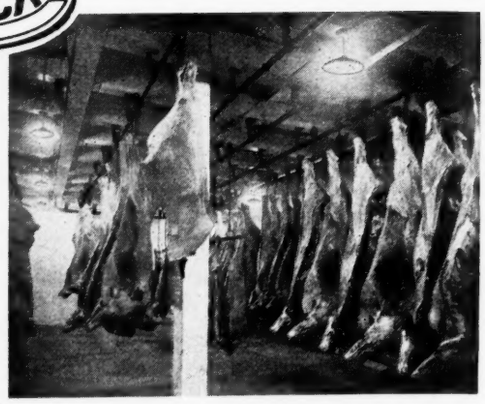
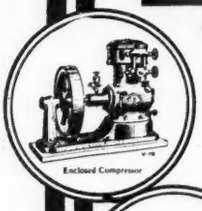


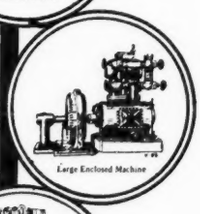


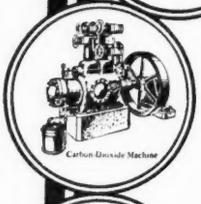
TRADE FRICK MARK

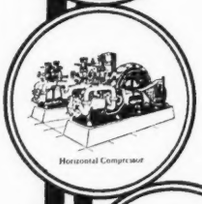


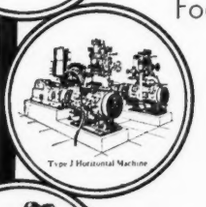
The beef sales cooler at the Moose Jaw Abattoir, Canada, is cooled by Frick Refrigeration.











The Food Industries Use All Types and Sizes of Frick Refrigerating Machines

Whether you handle meats, groceries, fish, fruits, dairy products, candy or other foods there's a Frick Refrigerating Machine of the type and size to meet your exact needs. Preferred for nearly 50 years by leading concerns in the Food Industries.

Write for literature and full details now.

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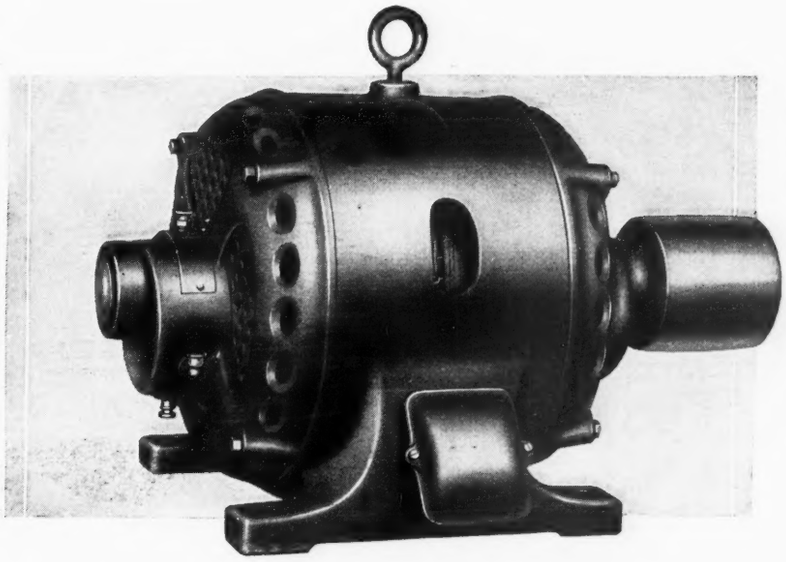
Frick Company
WAYNESBORO, PA., U.S.A.
ICE MACHINERY SUPERIOR SINCE 1882

THEY KEEP A-RUNNING

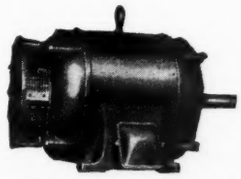


10 Horse Power Century Type SCH Low Starting Current... High Torque Double Squirrel Cage Induction 3 Phase Motor.

HIGH TORQUE— MORE ECONOMICAL

On general purpose jobs, it is often possible to use a lower-rated Century Type SCH Double Squirrel Cage Motor in place of a higher-rated standard Single Squirrel Cage Motor—because the static torque of the Double Squirrel Cage type is substantially higher than that of a standard normal torque squirrel cage motor of the same rating.

Another economy provided for by the Type SCH motor results from its drawing less starting current than the corresponding size normal torque single squirrel cage motor . . . No special current-limiting starting equipment is necessary for 30 horse power and smaller sizes, because their starting currents are within NELA requirements. Any approved across-the-line switch or starter may be used for starting.



Totally-Enclosed Fan-Cooled Motor. Built in standard sizes from 1½ to 150 horse power.

Built in standard sizes from 2 to 100 horse power.

CENTURY ELECTRIC COMPANY

1806 PINE STREET • • • ST. LOUIS, MO.

40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

SINGLE PHASE, THREE PHASE, AND DIRECT CURRENT MOTORS

Century MOTORS

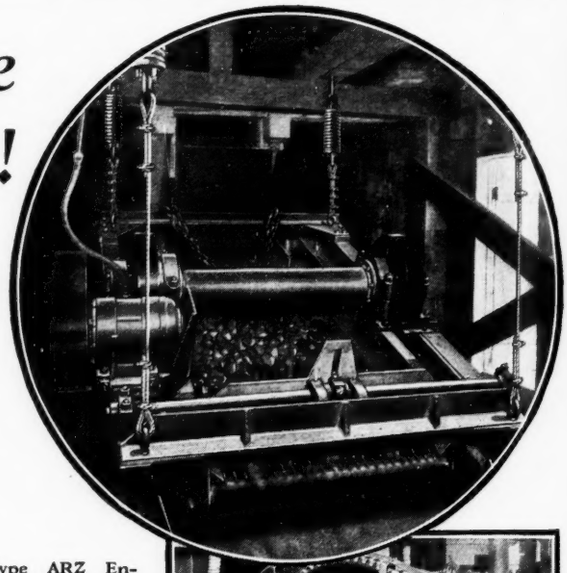
MOTOR GENERATOR SETS, ROTARY CONVERTERS, FANS AND VENTILATORS

FOR MORE THAN 27 YEARS AT ST. LOUIS

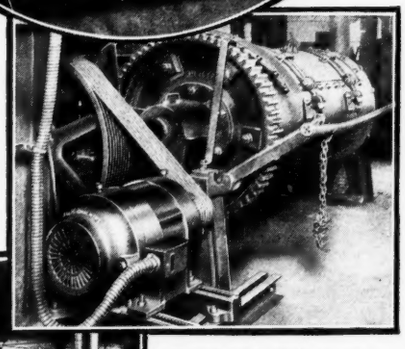
Ask Your Maintenance Man!

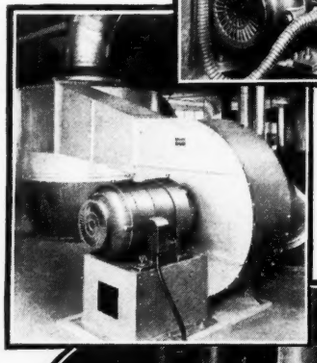
..where the troublesome drives in your plant are!

Ask him where dust, dirt, moisture, dripping water, or even destructive gases are present. Those drives in out-of-the-way places, where motor windings become clogged or moisture soaked. . . . Ask him to study the Allis-Chalmers Enclosed Fan-cooled Motors, approved by the Underwriters for dusty locations, and where explosive gases are present. . . . Ask him to notice how these motors have the same sturdy construction, liberal design, and unexcelled insulation, that for years have been characteristic of Allis-Chalmers motors. . . . Ask him to note also, how these enclosed fan-cooled motors are as easily accessible, and with no greater number of parts, than a standard open motor. . . . Ask him to write for Leaflet 2124, on the Enclosed Fan-cooled Motor, and Leaflet 2125A, on the Explosion-proof Motor.

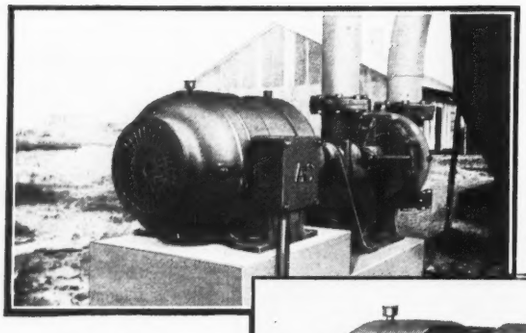


Type ARZ Enclosed Fan-cooled Motors are used on all Allis-Chalmers Centrifugal Vibrating Screens because these motors are best protected against dust, dirt and water.



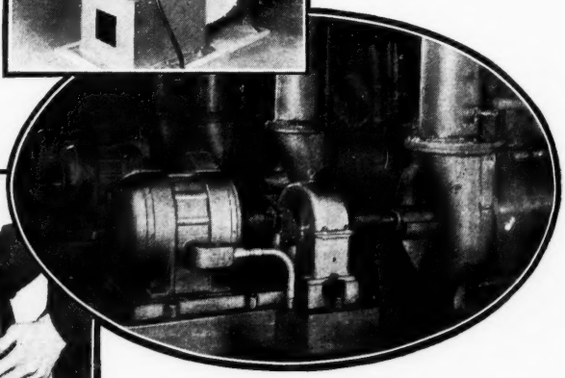


Even in a foundry atmosphere laden with iron dust and fine sand, type ARZ Motors operate without trouble. This motor operates a tumbling barrel for cleaning small iron castings.

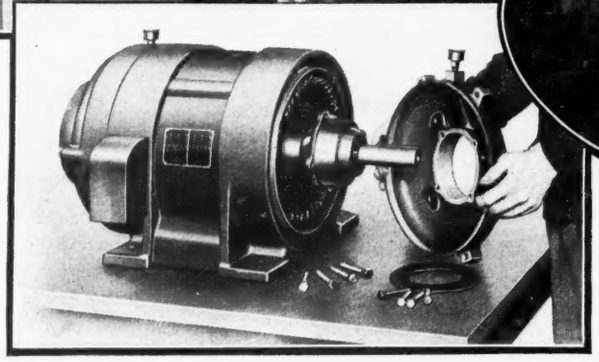


Right — ARZ motor driving fan in a starch mill where fine dust is always present and enclosed motors are necessary for safety of operation.

Left—Type ARZZ Explosion Proof Motor driving gasoline pump in Texas refinery. This motor saved the cost of a building and fire wall.



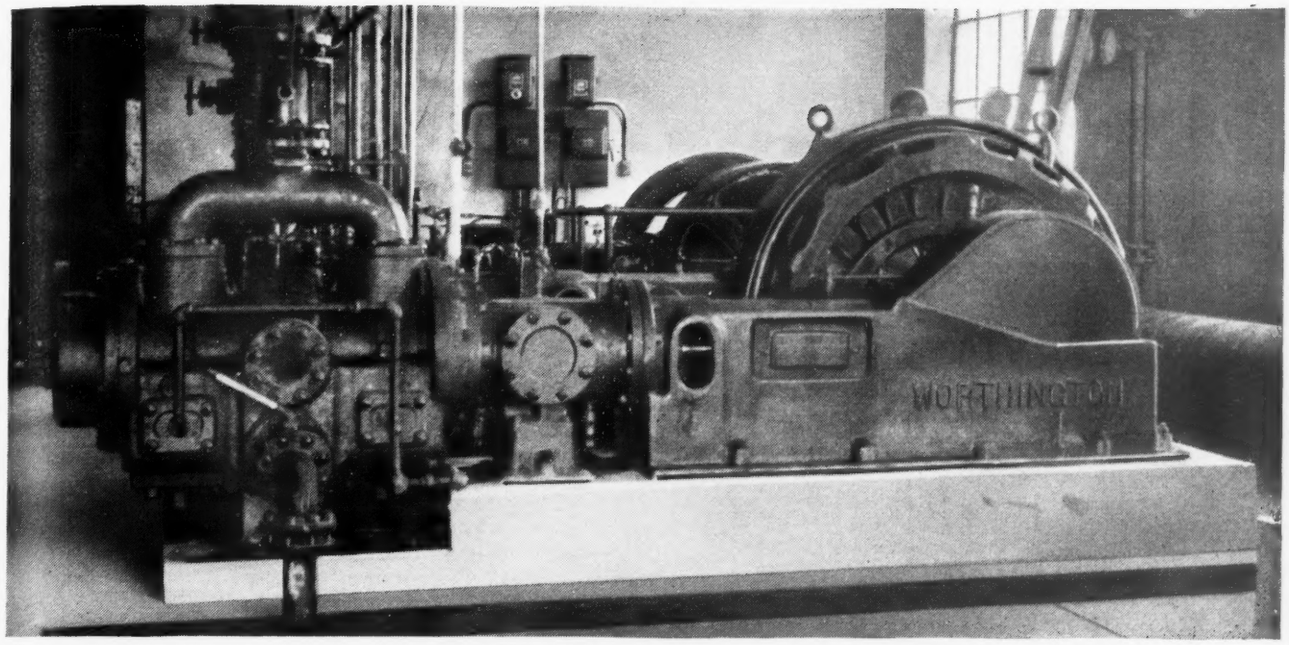
ARZ Motors driving rotary stock screens in a southern paper mill. This mill uses 15,000 h.p. of Allis-Chalmers motors, many of them enclosed as protection against gases, acids and water.



Allis-Chalmers Enclosed Fan - Cooled Motors are as readily accessible as those of the open type.

ALLIS-CHALMERS

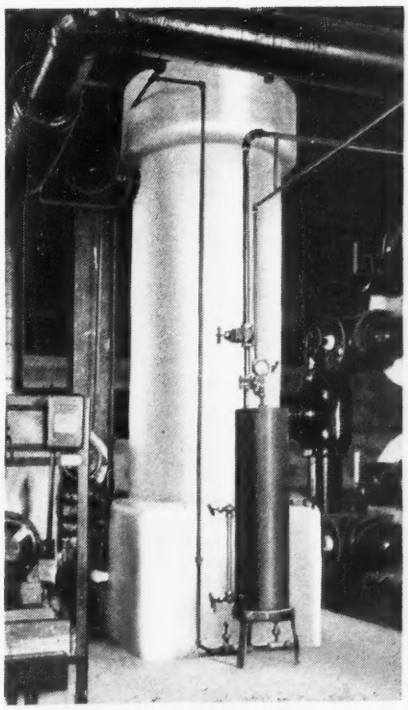
Allis-Chalmers Manufacturing Company, Milwaukee



Here, multiple effect refrigeration *provides economical quick-freezing*

15° F. below zero and less must be maintained to freeze the 5000 tons of fish that may annually pass through the plant of the New Jersey Ice and Cold Storage Company, Brant Beach, N. J. Refrigeration must be provided for the cold storage and for making ice to preserve the fish during distribution.

Carbondale has engineered a compression refrigerating system which provides real economies in meeting these conditions. A great savings in power cost has been made by obtaining the 15° F. by means of a two-stage Worthington Compressor. Then through the use of the multiple effect principle, the cold storage is carried by the same compressor with practically no increase in the power consumed. In fact, all three loads may be carried by the one compressor.



You will find it true of all Carbondale installations, that there is never any compromise with efficiency. This result requires a complete line of machines — which Carbondale has. But more than this, it demands an engineering knowledge such as Carbondale has acquired during more than 40 years of pioneering.

Whether the required refrigeration be a manufacturing process . . . for food preservation . . . for air conditioning . . . or the freezing of ice, you will find that it will pay to consult Carbondale. The service of experienced engineers is freely offered.

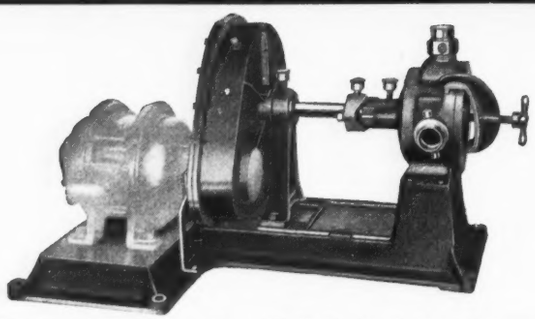
THE CARBONDALE MACHINE CO
Carbondale, Pa. *Branches in principal cities*
CANADIAN CARBONDALE CO.
102 Lombard Street, Toronto, Ontario

Carbondale Refrigeration

ABSORPTION AND COMPRESSION AMMONIA CARMAC SYSTEMS AND CO_2 COMPRESSION SYSTEMS

CARBONDALE AMMONIA COMPRESSION REFRIGERATING SYSTEMS USE WORTHINGTON "FEATHER VALVE" COMPRESSORS

Nothing Beats Simplicity In a pump



THE VIKING has but moving 2 parts

Quite naturally the fewer parts a pump has . . . the less wear there is . . . the fewer possibilities of breakage . . . and the less power it requires to operate it.

And, of course . . . a pump that has but two moving parts is so much easier to clean and to keep clean.

Remember this about sanitary pumps . . . the VIKING has but 2 MOVING PARTS. Quality and workmanship considered, it is the most reasonably-priced rotary pump on the market.

Write today for FREE Viking Catalog and Special Food Plant Bulletin

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VIKING PUMPS

Save Your Share of the

$300,000,000

Annual Loss in Foodstuffs

Destroy Insect Pests With

LARVACIDE (Chlorpicrin) REGISTERED

The Ideal Fumigant

There is no surer method of killing *all* types insects and rodents in *all* stages of life than with Larvacide.

It is self announcing to humans, thus making it safe for your own men to use. It forms no fire risk. Try it for thorough fumigation!

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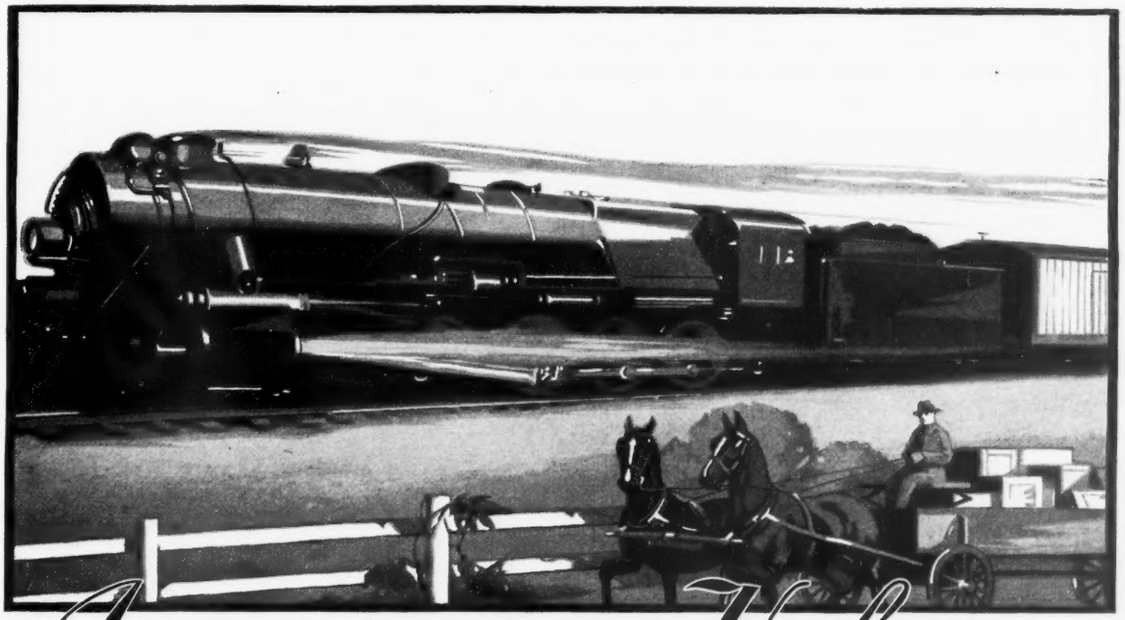
A FACT PICTURE OF THE FOOD FIELDS

A few copies are still available . . .

THIS booklet contains the latest available data concerning Production, Consumption, Exports and Imports and other valuable market information. Requests for it have poured into us from all parts of the world. Only a few hundred copies remain. Write today for your copy. Address the Promotion Dept.

FOOD INDUSTRIES • 330 W. 42d ST. • NEW YORK



Increasing Volume

MOST of us can remember when the family food-supply was limited to the things "in season" grown around the town in which we lived. Small loads of fresh food traveled the distance the farmer could cover between sun-up and market time. Sales were practically limited to staples.

Proper Packaging has changed all this. Now fresh foods of all kinds can be transported far and fast---offering wide variety and tremendously increasing the scope and sale of merchandise.

KVP FOOD PROTECTION PAPERS

have played an important part in this increase of volume and made possible a greater variety of perishable foods.

They give the product that protection which is so essential to the good looks and appetizing appearance when it reaches the consumer.

A special service is maintained for the benefit of all manufacturers, growers and shippers of foods---a fully equipped Research Laboratory is awaiting the privilege of working out your problems free of charge.

Just a line will bring complete details and information.

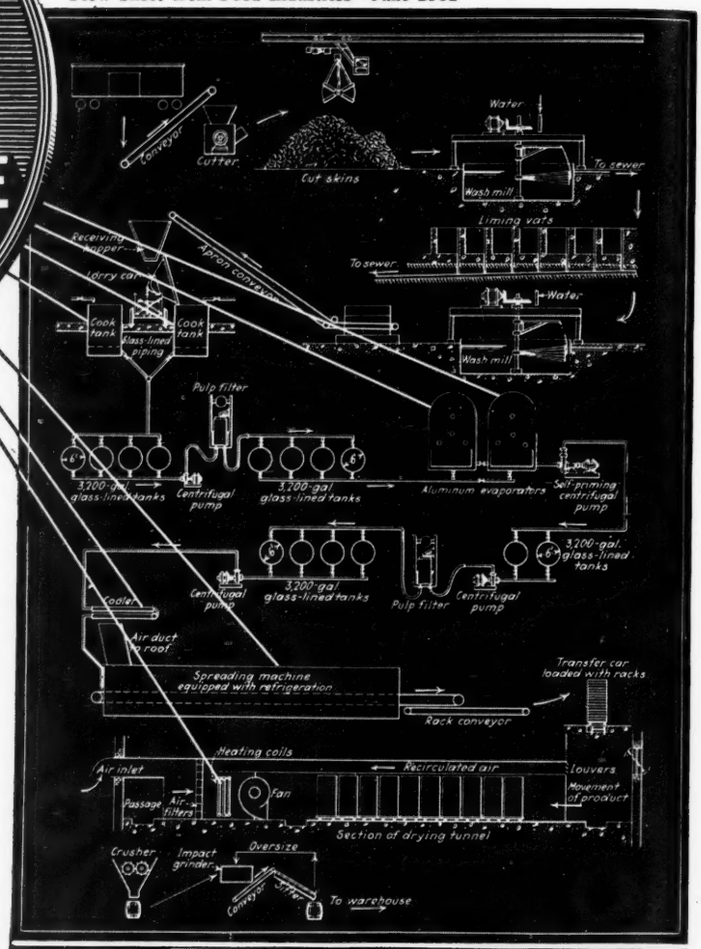
Kalamazoo Vegetable Parchment Company

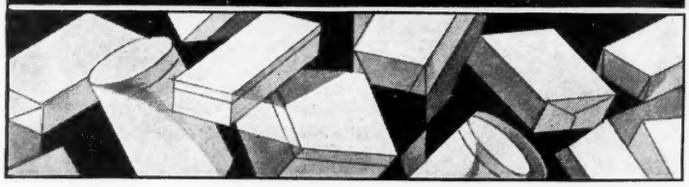
KALAMAZOO - - - - MICHIGAN

Manufacturing World-Famous Food-Protection Papers

FULTON Sylphon TRADE MARK FOR TEMPERATURE CONTROL

Flow Sheet from Food Industries—June 1931





in the GLUE *and* GELATINE Industry • • •

Fluctuations of a degree or two in the temperature of baths, or during the evaporation process, mark the difference between profit and loss on a complete and costly batch of material. For too high an extraction temperature lowers the test, darkens the color. Too low a temperature favors bacterial growth and decomposition.

It is so in the vital processes of many industries. Manufacturers are learning that it pays to control temperature.

Fulton Sylphon Engineers attack temperature control problems in the right manner—first, by continually studying the requirements and conditions in each industry—second, by designing soundly to meet these requirements—third, by intelligently adapting these instruments to your individual plant layout—and fourth, by building accuracy, dependability and long life into every instrument that bears the Fulton Sylphon name.

When you think of temperature control—think of Fulton Sylphon. Call upon our 27 years of experience as experts in this field, for recommendations that will save money in your plant. Or write, telling us the nature of your manufacturing process and we will send you a bulletin dealing specifically with your temperature control problems.

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KNOXVILLE, TENN., U.S.A.

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"Is It a Lot of Trouble to Keep Track of *Permanent* Containers?"

"Not Our Way—and When You *Can Save* about 40% in Your Shipping Costs—It's Worth the Effort"

The expense necessary to keep track of permanent containers and see that they are returned is extremely small compared to what many manufacturers are saving in shipping costs.

For example, manufacturer "A" used to spend about $11,000 per year for light weight shippers. After changing to Hackney returnable steel drums, he figures his cost at $6,500 per year—a saving of 40%.

And that $6,500 includes interest, depreciation, return freight, maintenance, insurance, cleaning, extra freight on out-shipments as well as clerical costs.

Let us assist you in an investigation of your shipping problems to see if similar savings cannot be made in your costs. Our 30 years' experience in this field is available to you without cost or obligation.

A Few Prominent Hackney Users

Colgate-Palmolive-Peet • Du Pont • A. T. & S. F. R. R. • Buick Motor • Chas. Eneu Johnson & Co. • International Printing Ink • Armour & Co. • National Carbide.

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THE *Newest Development*

IN COFFEE PROCESSING

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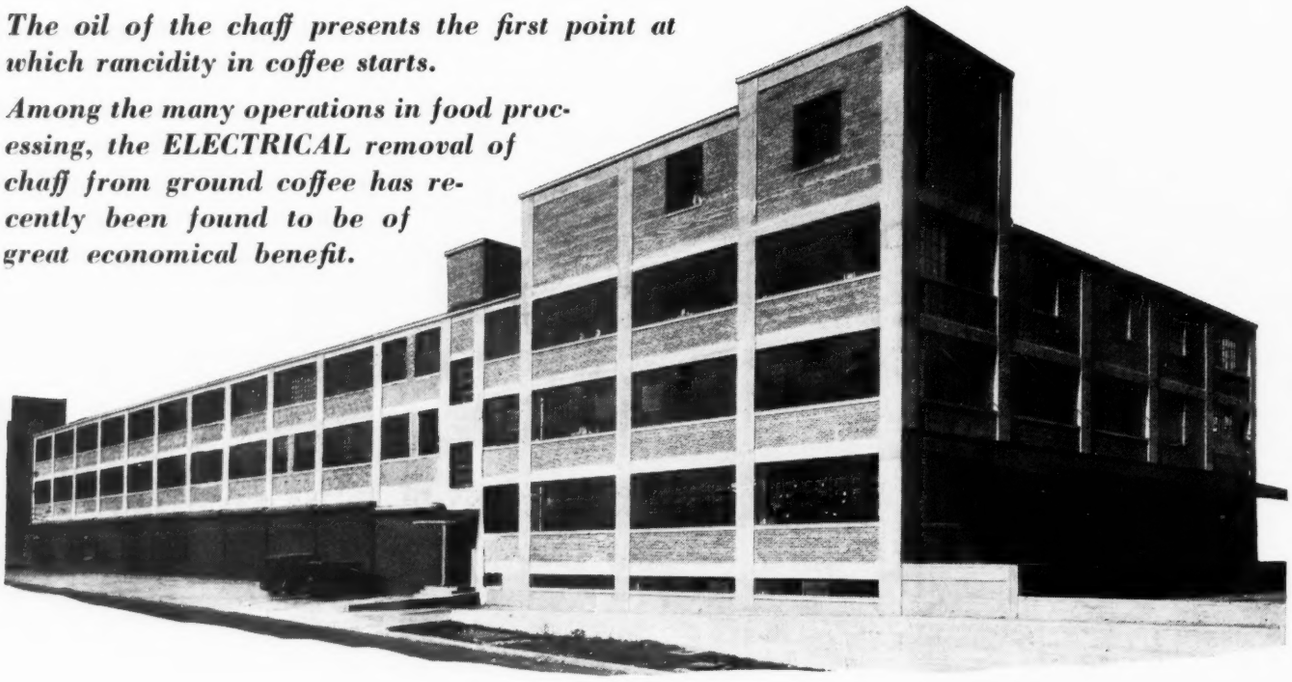
The oil of the chaff presents the first point at which rancidity in coffee starts.

Among the many operations in food processing, the ELECTRICAL removal of chaff from ground coffee has recently been found to be of great economical benefit.



Recent installations in food industries are giving satisfactory service and our long experience in electrical separation permits us to give you sound advice.

1. **If you have any product where the same weight precludes gravity separation,**
2. **Where size and shape preclude screen separation,**
3. **Where similar surface areas preclude air separation,**
4. **Or where both or neither materials are magnetic,**

You should investigate and know about the art of ELECTRICAL SEPARATION. The process is NEW as applied to food materials. It offers possibilities for separations heretofore not possible by other methods.

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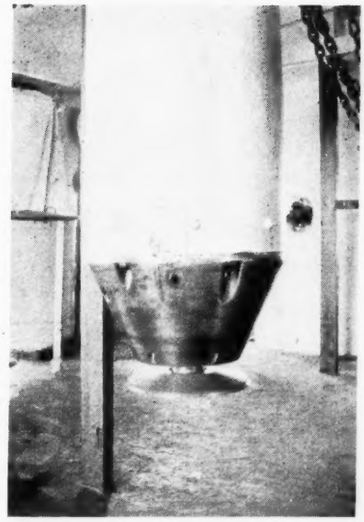
CARTHAGE MACHINE COMPANY - CARTHAGE, N. Y.



What NEW PRODUCT will you bring out in 1932?

Every food manufacturer is competing for his share of Mrs. Consumer's dollar. And each is baiting his hook with a new product.

What are you doing to get this *new* business? What is 1932 going to mean to *you* in new business on new products?

Spray Drying offers a ready, practical method of developing and creating new products of worth-while sales value. Profits are already being made on many applications of spray drying. Eggs, yams, bananas, corn, milk and a host of other commodities are being reduced to a dry condition, preserved imperishable and merchandised profitably.

And just as many opportunities await development. Bowen Research is ready to help you uncover these new profits.

Arrange for the use of our spray drying laboratory for experimental tests on your product on a practical basis.

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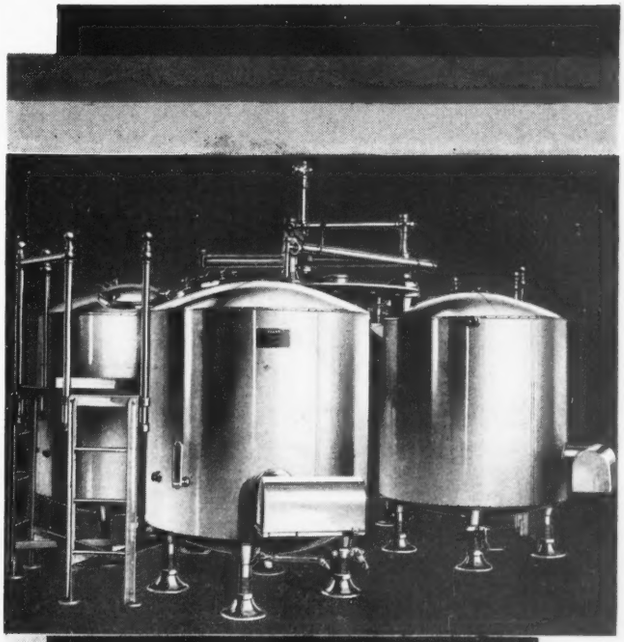


SPECIALIZED EXPERIENCE

In building Stainless Steel Equipment

Chromium Nickel Steels, with their corrosion resisting qualities, are a boon to food manufacturers. They safeguard the purity, taste and color of food products.

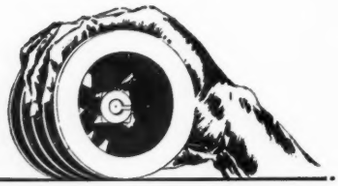
Stainless Steels present unusual problems to the manufacturers of equipment. Careful and experienced handling is required for the best results. A new technique of fabrication had to be developed so that the inherent qualities of the metals could be retained.

We have built much food manufacturing equipment of stainless steel. We understand its peculiarities—can retain its excellent characteristics for the finished equipment.

Specialists in Tanks, Vats, Holding Tanks, Storage Tanks, Steam Jacketed Vessels, Vacuum Pans, etc.

With this knowledge and experience, we are in an excellent position to build your stainless steel equipment. May we consult with you on your next job?

CREAM CITY BOILER CO.
1603 So. 43rd St., Milwaukee, Wis.
Alloy Products & Steel Tanks



Its grip is flexible . . . yet positive

WORTHINGTON MULTI-V-DRIVE

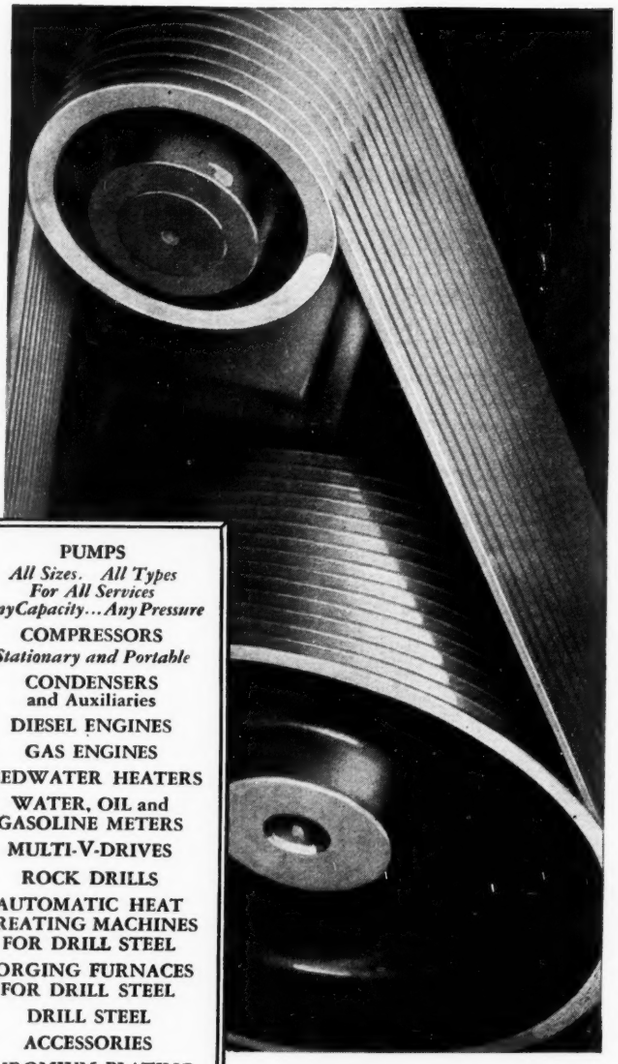
IN power transmission, the combination of flexibility and positive drive always has been a difficult one to achieve. Belt slippage has usually accompanied any means of absorbing shock loads and vibration. And devices to prevent slippage have sacrificed elasticity or built up excessive bearing pressures.

With the Worthington Multi-V-Drive, however, this ideal union of flexibility and positive drive has been realized, even when applied to extremely close centers.

Goodyear and Worthington produce this drive which stands the gaff of modern industrial service, and which transmits, silently and with little attention, an extremely high percentage of the applied power.

Many progressive plants have proved that the Worthington Multi-V-Drive introduces economies which soon pay for its installation.

Ask the nearest Worthington office for more details.



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All Sizes. All Types For All Services Any Capacity... Any Pressure
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Here You Have a Complete Line of High Grade FOOD PROCESSING EQUIPMENT— *PLUS*

A Helpful Engineering and Advisory Service

CRUSHERS
GRINDERS
PULVERIZERS
SIFTERS
MIXERS
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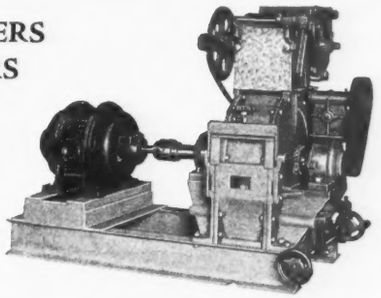
and
Special Items

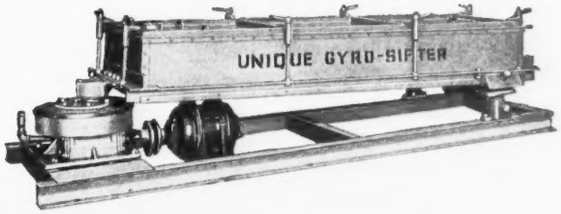
We can offer you an extensive line of standard machines and appliances for a great variety of uses. Use one of these standard machines if it fits your need but don't for the sake of a slightly lower first cost endanger the quality of your product or reduce your operating efficiency. Robinson Engineers will tell you gladly if a standard machine will do the job or recommend such slight variations from standard to meet your exact needs.

CRUSHERS, GRINDERS AND PULVERIZERS



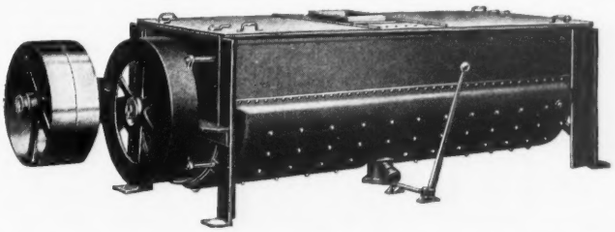
We build a variety of these machines for operating on practically any product. The Pulverizer shown is a powerful compact machine of advanced design for uniformly reducing such materials as sugar, salt, spices, colors, dyes, lime, gums, soaps, etc. Requires no separators, fans or collectors. Operation is entirely dustless. Results are certain, always.

UNIQUE GYRO-SIFTERS



Our Gyro-Sifter is especially noted for its wide flexibility in making distinct, accurate separations with the least maintenance and attention. These quality Sifters may be combined in compact units with UNIQUE Mixers and Grinders, making an efficient time-saving set-up. These machines help materially in bettering your product and reducing operating costs.

UNIQUE MIXERS



A complete line of Mixers from small laboratory models to mammoth large capacity machines—for definite operations on an endless variety of materials. Now in successful use in processes for all kinds of food products, confections, salts, dyes and colors, soap products, ceramics and all kinds of chemicals. They mix quickly and thoroughly, operate with the minimum power consumption and require practically no attention.

Put your food processing problems up to UNIQUE Engineers. They are in position to recommend equipment best suited for the job and plan its most effective installation.

UNIQUE

ROBINSON MFG. CO.

71 PAINTER STREET, MUNCY, PENNSYLVANIA

MANUFACTURERS OF FOOD PROCESSING EQUIPMENT

Get this Booklet before you buy Heating Equipment

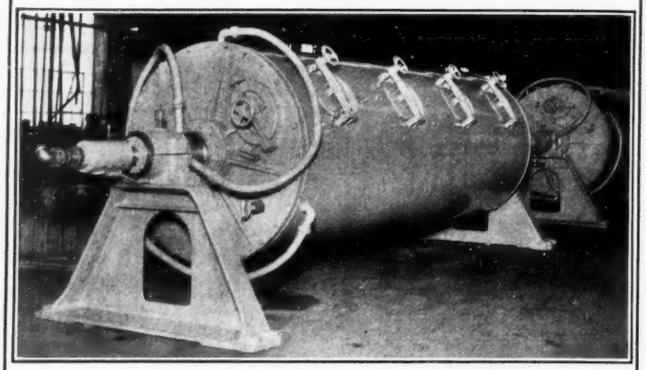
Hundreds of executives have asked for information on Buffalo Gas Unit Heaters—the units that provide CLEAN, ECONOMICAL HEAT—be sure that YOU have all the facts about MODERN Gas Heating before you buy any kind of heating equipment.

A line on your letterhead will bring a copy of the booklet.

Buffalo Forge Company
181 Mortimer Street, Buffalo, New York
In Canada:
Canadian Blower & Forge Co., Ltd.
Kitchener, Ontario

Buffalo Gas Unit Heaters
Floor and Suspended Type

1 Piece of Apparatus Takes the Place of 3



Combination Equipment for Soaking, Drying and Roasting under Vacuum

A FEW months ago we developed for a food manufacturer the apparatus shown above which combined three operations in one piece of apparatus. Formerly three separate pieces of equipment were used. Nothing more regarding the economies effected need be said beyond the fact that this manufacturer has just duplicated the order with the comment, "No suggestions for change—apparatus works perfectly."

For 36 years, we have assisted our customers to solve their process problems economically. We have a testing laboratory and a complete manufacturing plant. All are at your service. Consult us on the equipment listed.

- Vacuum Rotary Dryers
- Atmospheric Drum Dryers
- Vacuum Shelf Dryers
- Evaporators
- Tablet Compressing Machines
- Solvent Recovery Apparatus
- Tube and Jar Fillers and Closers
- Powder Fillers and Cappers
- Starch and Food Dryers
- Extractors
- Mixers
- Vacuum Stills
- Vacuum Mixing Pans
- Autoclaves
- Condensers
- High Vacuum Pumps
- Vacuum Fumigators
- Water Stills
- Special Process Equipment

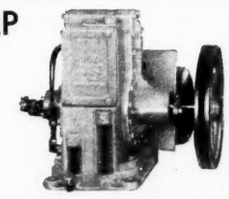
FJS

SEND FOR CATALOG NO. 31

NEW HIGH VACUUM PUMP

For all processes requiring high vacuum, we have developed a rugged, practical, simple, oil-sealed type of vacuum pump which will produce a vacuum within .01 millimeter or better. Sizes, 10 to 225 cu.ft. per minute.

Write for Booklet, 149A
(Contains valuable graphs and engineering data)



FJS STOKES MACHINE COMPANY
Process Equipment Since 1895
5976 Tabor Road, Olney P. O., Philadelphia, Pa.
New York Office: 103 Park Ave. Chicago Office: 75 E. Wacker Drive
Los Angeles Office: 1231 E. 7th St.

The Safety of a Steel Barrel

PLUS

freedom from contamination *with* PROTECT-O-LINE

Left

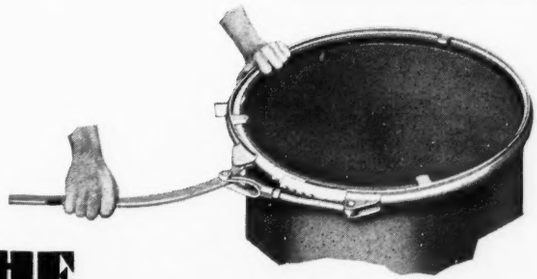
QUIK-LOX

A one-piece rim and lever arrangement which forms an air tight seal with the special designed top of National Open Head Steel Drums. Requires no nuts, bolts, screws or tools.

Below

SNAP-LOX

A simple lock rim very much like the Quik-Lox only requiring a simple tool to lock rim in position. This also is used in connection with National Open Head Steel Drums and is used on the same covers as Quik-Lox.



NATIONAL Steel Barrels with either Quik-Lox or Snap-Lox offer a unique container where a full open-end package is desired.

There are no bolts, nuts or screws. Complete security against leakage or theft in transit is assured. Easily and rapidly sealed and just as easy to open.

The heavy rubber or composition gasket is air, gas and oil tight insuring positive protection to contents from the outside elements.

PROTECT-O-LINE

This edible liner is neutral and cannot affect the taste, odor or composition of products shipped.

Used in National Steel Barrels Protect-o-line is of especial value to shippers of food products such as cooking oils, fruit juices, fruits, vegetables and the like.

We will be glad to confer with you on the possibility of using National Steel Barrels with Protect-o-line. Samples will be furnished responsible companies.

THE NATIONAL STEEL BARREL CO....

3860 EAST 91ST STREET ··· CLEVELAND, OHIO

AN ADHESIVE FOR EVERY MACHINE OR HAND OPERATION

"DOWN and OUT!"

Is that the way the labels look on your bottles when they come from the ice-chest? Then use

MIKAH

BOTTLE-LABELING GUM

and be assured that your bottles will always appear as smart and attractive as when they left the labeler.

ICE PROOF
ECONOMICAL
HOLDS INDEFINITELY
WORKS SMOOTHLY

NATIONAL ADHESIVES CORPORATION

Home Office—820 Greenwich St., New York

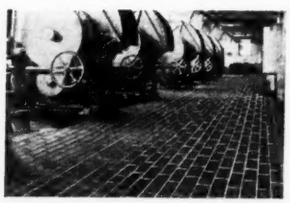
1940 Carroll Ave., Chicago—883 Bryant St., San Francisco
15 Elkins St., Boston—1305 Germantown Ave., Philadelphia

WORLD'S LARGEST PRODUCER OF ADHESIVES

Sales Offices in all principal cities

BETTER FLOORS

How would you like to *eliminate* floor troubles and repair costs?



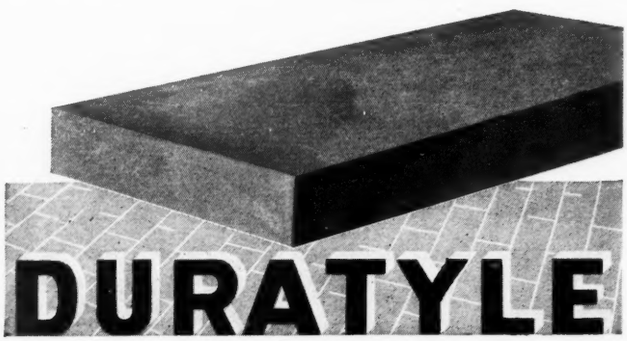
And we mean *eliminate,* not for a year or two, but for 10 or 20 years or even more.

We inspected, just recently, a Duratyle floor in a meat packing plant that had been installed for 22 years, had been in constant hard use and hadn't cost a dollar for repairs in all that time.

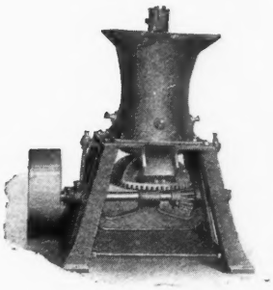
Duratyle is tough as well as acid proof, water proof and grease proof. It is durable. And it can be laid right over your present floors.

Write for full particulars

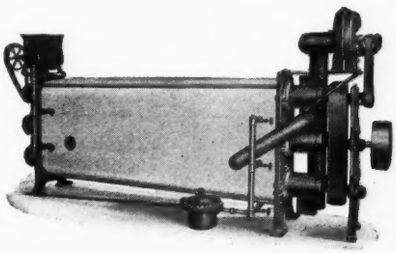
DREHMANN
PAVING & CONSTRUCTION CO.
508 Glenwood Ave., Philadelphia, Pa.



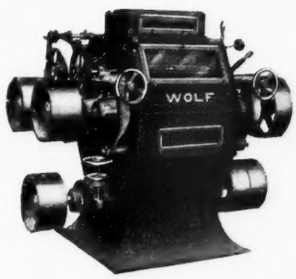
DURATYLE



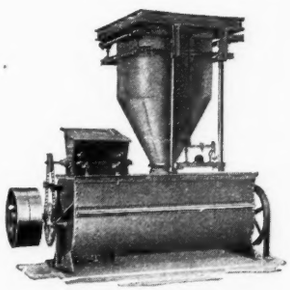
CRUSHERS



DRYERS



GRINDERS



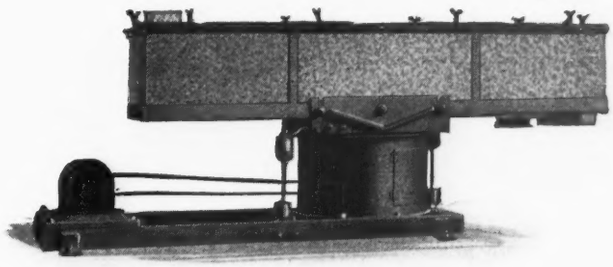
MIXERS

PACKERS

WOLF

MACHINERY

For powdered, granular or flaked materials. In processing starch, dry milk, flour, cereals, sugar, gelatine, spices, licorice root, cracker crumbs, cocoa, cocoanut and similar food products, Wolf equipment is being used to good advantage. Our engineers give valuable assistance in improving present methods and developing new ones.



THE SUPERSIFTER

This is the latest addition to our line of widely diversified sifting equipment. A full circular motion at every point of the sieve box develops high sifting efficiency per square inch of screen. Its motion is smooth and regular, causing no floor vibration. The Supersifter is made with motor or pulley drive, and in sizes having 1 to 96 square feet of sieve.

Samples of your materials will be processed without any obligation.

THE WOLF COMPANY

200 Commerce St. WOLF EQUIPMENT Chambersburg

Pennsylvania

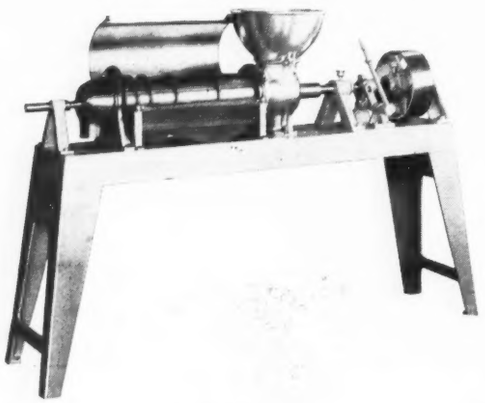
New York Office, 18 E. 41st St.

The Sep-Ro-Siv

(Separates and sieves)

May solve some of your production problems

New uses are being discovered constantly



HOW IT WORKS

A spiral with a tapered core gradually presses the product against heavily reinforced screens, furnished in many different perforations. Seeds, skins and roughage are either discarded at the end of the screen, or machine can be set to break down or grind or grate entire product through the screen.

HAS MANY USES

Most of the manufacturers of tomato juice used this machine under the name of the "American Extractor" for making tomato juice this season. It was also used extensively last winter for extracting the juice from citrus fruits. Some of its other uses are: to make applesauce; to break down, sieve and strain food products of all descriptions; to pulverize and pulp raw vegetables; to make fruit concentrates and extracts from oranges, lemons and limes; to make fresh fruit flavoring for sherberts, ices and ice cream from oranges, lemons, berries, cherries and bananas; to extract the oil from citrus fruit peeling; to press the juice and pulp from liver and raw meats for extracts.

ADVANTAGES

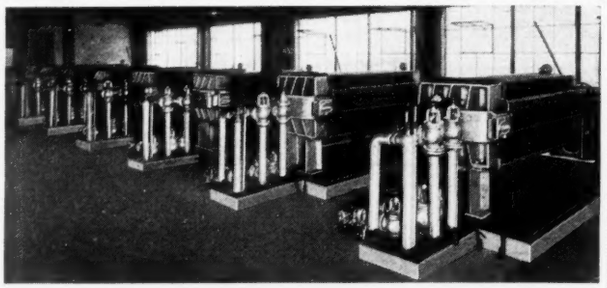
Simplicity of construction, non-aerating, non-agitating, made in both stainless and non-stainless metals, works by pressure and not by speed. Screens furnished in any perforation desired, from 20/1000 of an inch in diameter to $\frac{5}{10}$ of an inch in diameter.

MADE IN DIFFERENT SIZES

The Sep-ro-siv is supplied in a large range of sizes from the small laboratory model that sells for $15.00, to high production machines which sell for $650.00, all operated on the same principle.

Write for more information and literature.

AMERICAN UTENSIL CO.
10 S. LaSalle Street
CHICAGO



SHRIVER FILTER PRESSES

Filter Crisco

Crisco, the right cooking arm of the housewives, the chefs and the cooks of the world, is another famous food product, filtered during processing with Shriver Filter Presses. Many prominent food firms are using Shriver Filter Presses to their profit.

Your Inquiries are Solicited

T. SHRIVER & COMPANY
Established 1860

860 Hamilton Street Harrison, N. J.

A Filter Press For Every Purpose

SHRIVER

Filter Presses Filter Cloth Diaphragm Pumps

TANKS

that are engineered to Fit

For almost 75 years, Graver has served the industries which represent the largest users of tanks. From small, welded tanks to the largest field-erected storage equipment—Graver builds all kinds and sizes. Graver engineering has kept pace with industrial development. Whether you need standard tanks or equipment specially fabricated to unusual specifications, there's an assurance that Graver experience will produce an "engineered" product. Our engineering service is yours for the asking.

GRAVER TANK & MFG. CORP., East Chicago, Ind.

Manufacturers of

GRAVER TANKS

also . . . America's largest designer and manufacturer of a complete line of Water Treating Equipment

(U. S. PATENTS APPLIED FOR)

Wrapped right—sealed tight the final test of sales

Transparent packaging is an accepted fact by both food manufacturer and consumer. Every day, new items are finding accelerated sales through this improved method of modern packaging.

And with this rapid development comes a greater need for technical service—for the right wrapper—the final test of all-round satisfaction.

NYMPHRAP EXTRA offers an invaluable means of wrapping food products right and sealing them tight. For by test and in actual practice, this moisture-proof transparent cellulose paper can be sealed with moderate heat, eliminating the use of objectional adhesives and undesirable solvents. Or adhesives may be used if desired.

Then, too, NYMPHRAP EXTRA is safe and sanitary—free from tri-cresyl-phosphate. It is equally well adapted to wrapping and sealing by automatic machines or by hand.

And its moisture-proofness and clean transparency insure that freshness and attractiveness which promote sales.

Our technical staff is at your call to help you improve the merchandising of your products through adequate packaging and wrapping.

NYMPHRAP EXTRA
(Moisture-proof)
SYLPHRAP
(Non-moisture-proof)

SYLVANIA INDUSTRIAL CORPORATION

EXECUTIVE AND SALES OFFICES : 122 EAST 42ND ST. : NEW YORK

THE CO-OP., TOO, KNOWS VILTER

Not only in food processing is Vilter ice-making and refrigerating machinery considered the standard... but in every other phase, as well.

For instance... the Bellingham plant of Washington Co-Operative Egg & Poultry Association uses an installation engineered by Vilter.

Here, with a Vilter Vertical (7½ x 7½) food storage is safe, simple, certain. The various desired temperatures are held unvarying for long periods.

And so economical is the operation of Vilter-designed systems that accurate control of temperatures is maintained at all times at the minimum cost.

For any application of refrigeration consult our Engineering Department. Write!

THE VILTER MANUFACTURING CO.
2115 So. 1st Street - Milwaukee, Wis.

SINCE *Vilter* 1867

ICE-MAKING AND REFRIGERATING MACHINERY

The Vilter Manufacturing Co.,
2115 So. 1st St., Milwaukee, Wis.

Gentlemen:

Please send me information regarding refrigeration for

.....

Name.....

Address.....

15-31

CITRIC ACID

Merck's Citric Acid is the Gold Medal Standard for food, confectionery and beverage products. We have had 58 years of experience in the manufacture of this article... Merck's Citric Acid is supplied in the crystal, granular and powder forms... Shipped in kegs, barrels or carloads... Also Lactic, Tartaric, Phosphoric and other acids...

Elliott Cresson Gold Medal awarded for perfection of product.

SODIUM BENZOATE

Merck's Sodium Benzoate is white, clearly soluble, and free from foreign odor or taste... Approved by the manufacturers of delicately flavored products.....

METHYL SALICYLATE

One of Merck's "taste-like-more" flavors for fine confectionery, extracts, birch beer and other food products... Imparts the true flavor of Wintergreen... Our facilities are unlimited. Stocks fresh and pure. Put up in convenient 50 lb. tins or larger...

CREAM OF TARTAR

MILK SUGAR

VANILLIN

and many other products

FOR DAIRY CONTROL

Our Ether Concentrated and Benzin Purified are especially designed for large-scale fat determinations in the control of dairy products....

The services of our Sales Organization and the scientific resources of our laboratories are at your disposal in the selection of products adapted to your needs.

MERCK & CO.

INC.

MANUFACTURING CHEMISTS

Industrial Division: 916 Parrish St. Philadelphia — RAHWAY, N. J. — New York — St. Louis — In Canada: MERCK & CO. LTD. Montreal

A BARREL FOR EVERY PRODUCT

There are few food or chemical products that are not adaptable to shipment in Wooden Barrels. For those that are the Wooden Barrel offers definite advantages over other types of container.

Whether your product is liquid, semi-liquid, moist, or dry, one of the various types of barrels manufactured today, each with different qualities of strength, durability, and economy, will prove suitable for its shipment.

The Associated Cooperage Industries will give you expert advice on the subject of the barrel best adapted to your product. Write to them for information on this subject and for further data on the economy of the Wooden Barrel.

PARTIAL LIST OF PRODUCTS SHIPPED IN BARRELS

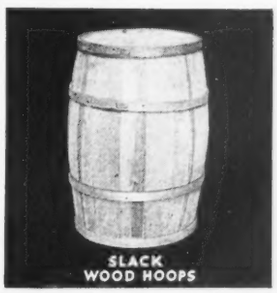
FOODS

Beverages
Butter
Condensed Milk
Cooking Oils
Fish
Kraut
Molasses
Pickles
Soups
Fruits
Candy
Cereals
Coffee
Meat
Sugar
Salt
Spices
Vegetables

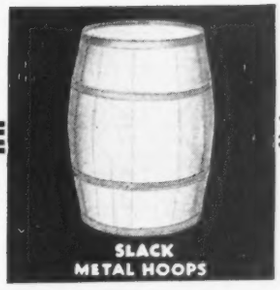
CHEMICALS

Borax
Bleaching Powder
Calcium Chloride
Dry Paint Colors
Graphite
Sodium Carbonate
Sulphur
Soda Ash
Sodium Nitrate
Zinc Oxide
Acetic Acid
Acetone
Alcohol
Arsenate of Lead Paste
Carbon Bisulphide
Cements, Liquid
Lead Oxides
Paints

ASSOCIATED COOPERAGE INDUSTRIES OF AMERICA
RAILWAY EXCHANGE BUILDING **ST. LOUIS, MISSOURI**



WOODEN BARRELS

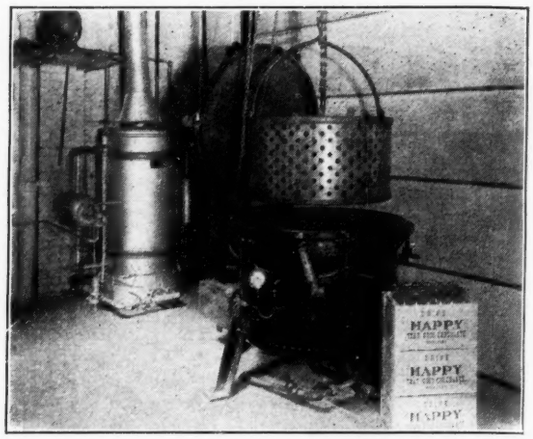


The best boiler is Automatic-Gas-fired Quick-Steaming!

For food processes—as with all processes, the best steam source is automatic, gas-fired, quick-steaming. There are other requirements, but these are obviously the most important ones.

Ofeldt boilers satisfy these requirements to perfection. Ofeldt boilers steam 4 minutes after lighting. They are gas-fired and automatic, and they are made by pioneers in automatic gas-boiler control . . .

And Ofeldt boilers are compact so that they may be placed alongside the process, eliminating long pipe lines. Ofeldt boilers also end fuel and ash disposal problems, firing troubles, and delays. Steam delivered is always unvarying in pressure or temperature, and is chemically clean steam. A wide range of sizes makes it possible to match the process with the exact OFELDT required. WRITE US FOR BULLETINS AND DETAILS.



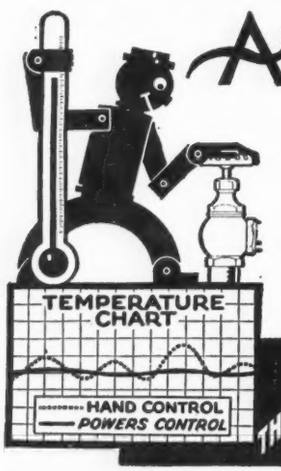
7 H.P. Style A Ofeldt Boiler supplying steam for the Pasteurization of a popular chocolate drink

Steam in 4 minutes
Ofeldt

MEARS-KANE-OFELDT INC.

Executive Office and Factory
1903-1915 EAST HAGERT ST. PHILADELPHIA
Branch Offices or Distributors in Principal Cities

Makers of Automatic Gas Boilers for over a Quarter Century

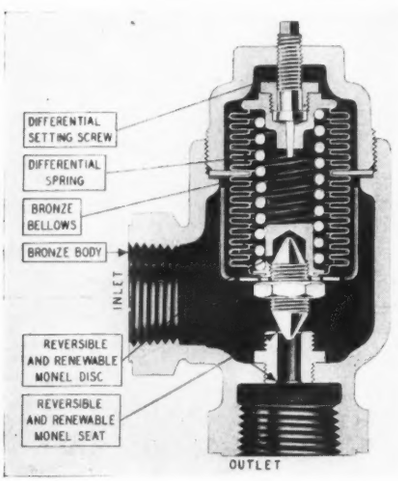


Automatic Temperature Control

TO ERR IS HUMAN—eliminate the errors of hand control of temperature with the mechanical accuracy of a Powers Regulator. It will quickly pay for itself by speeding up production—helps you to get a still better and more uniform product, and stops steam losses due to overheating. Let our engineers study your problems of temperature control and recommend the type of regulator that will give the best results at the lowest cost.

CHICAGO—2755 Greenview Ave. **NEW YORK—231 E. 46th St.**

THE POWERS REGULATOR CO.
OFFICES IN 40 CITIES
40 YEARS OF SPECIALIZATION IN HEAT CONTROL



NEW TAG STEAM TRAP BULLETIN

Send for it . . . then get a trap for
30 Days FREE Trial

TAG now offers the canning industry a Thermostatic Steam Trap with many new and unique features including the TAG Differential Setting Feature . . . a sure guarantee of actual saving of steeam dollars.

TAG has prepared a most interesting bulletin giving in full detail the advantages of the TAG Differential Setting Feature and the many other fine points which make this an outstanding trap. Use the coupon to get your copy. Use the same coupon to take advantage of TAG's 30 Day FREE Trial Offer. No strings attached. You can get a TAG Steam Trap to test in your own plant for 30 Days FREE.

C. J. TAGLIABUE MFG. CO.
Park & Nostrand Aves., Brooklyn, N. Y.

C. J. Tagliabue Mfg. Co.

Gentlemen:

Please send copy of Bulletin 1015-2. Also send trap. After 30 days we will either return or accept invoice at $12. Net, F.O.B. Factory.

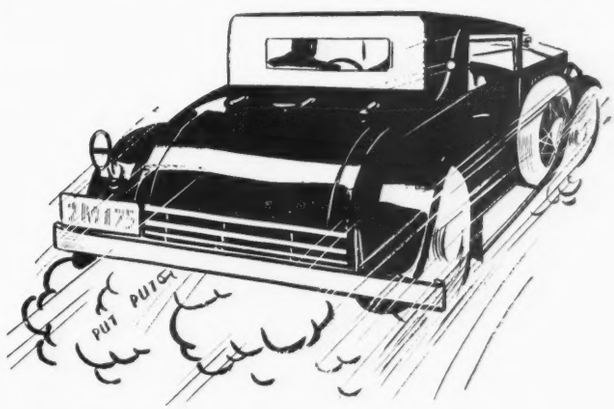
Name .....

Address .....

They're beginning to equip cars with enameled exhaust pipes—BECAUSE ENAMEL PREVENTS CORROSION!

DID you ever hear of an enameled exhaust pipe for motor cars? It's a fact — and for no other reason than to prevent corrosion. Enamel has proved the most expedient remedy.

Corrosion is a destructive force. In the Food Industries it is accelerated by acids and this takes a huge toll, not alone in equipment, but in spoiled products.



History teaches that glass resists corrosion as no other medium does. Ample proof is found in unearthed ruins where glassware, from two to three thousand years old, has been found intact.

Glass fused onto steel by the Pfaudler process permits you to utilize its corrosion-resisting qualities economically—without its weaknesses. Backed by the strength of steel, Pfaudler glass lined equipment is used for all process operations and for handling all acids regardless of concentration or temperature.

Why not investigate Pfaudler equipment for *your plant?* It prevents corrosion, is easy to clean, is lasting, and many standard designs are available at low prices.

Write for catalogs. Please feel free to consult us on your problems.

THE PFAUDLER COMPANY
1510 Gas & Elec. Bldg., Rochester, N.Y.
New York · Elyria, O. · Chicago · San Francisco · Los Angeles · Montreal

New Pfaudler Glass Lined Automatic Pasteurizing System

6,000 Lbs. Per Hr. Capacity

In addition to the Automatic Horizontal Holders now manufactured in capacities from 8,000 to 20,000 pounds per hour, The Pfaudler Co. is pleased to announce the addition of a 6,000 pounds system with vertical holders.

Master valve, electrically operated, controls application of vacuum and air pressure for filling and emptying respectively. No milk passes thru master valve.

No drippage of milk as in the case of circular holders with sector-chambers which pass under incoming milk line.

Entire pasteurizing system is closed, but milk can always be observed through observation glasses. Send for Bulletin 738.

Pfaudler

GLASS-LINED STEEL

A clean, lasting, acid-resisting surface

THE STANDARD WITH WHICH OTHERS ARE COMPARED

Keep his head up

and we'll all come through!

You recognize this man. He lives in your own town, not far from you . . .

Though faced with unemployment, he is combating adversity with courage. He has retreated step by step, but fighting. He has spread his slender resources as far as they will go.

This winter he and his family will need your help.

There are many other heads of families much like him in the United States. This winter all of them will need the help of their more fortunate neighbors.

This is an emergency. It is temporary. But it exists. It must be met with the hopefulness and resource typical of American conduct in emergencies.

Be ready! Right now in every city, town and village, funds are being gathered for local needs—through the established welfare and relief agencies, the Community Chest, or special Emergency Unemployment Committees . . .

The usual few dollars which we regularly give will this year not be enough. Those of us whose earnings have not been cut off can and must double, triple, quadruple our contributions.

By doing so we shall be doing the best possible service to ourselves. All that America needs right now is courage. We have the resources. We have the man power. We have the opportunity for world leadership.

Let's set an example to all the world. Let's lay the foundation for better days that are sure to come.

The President's Organization on Unemployment Relief

Walter S. Gifford

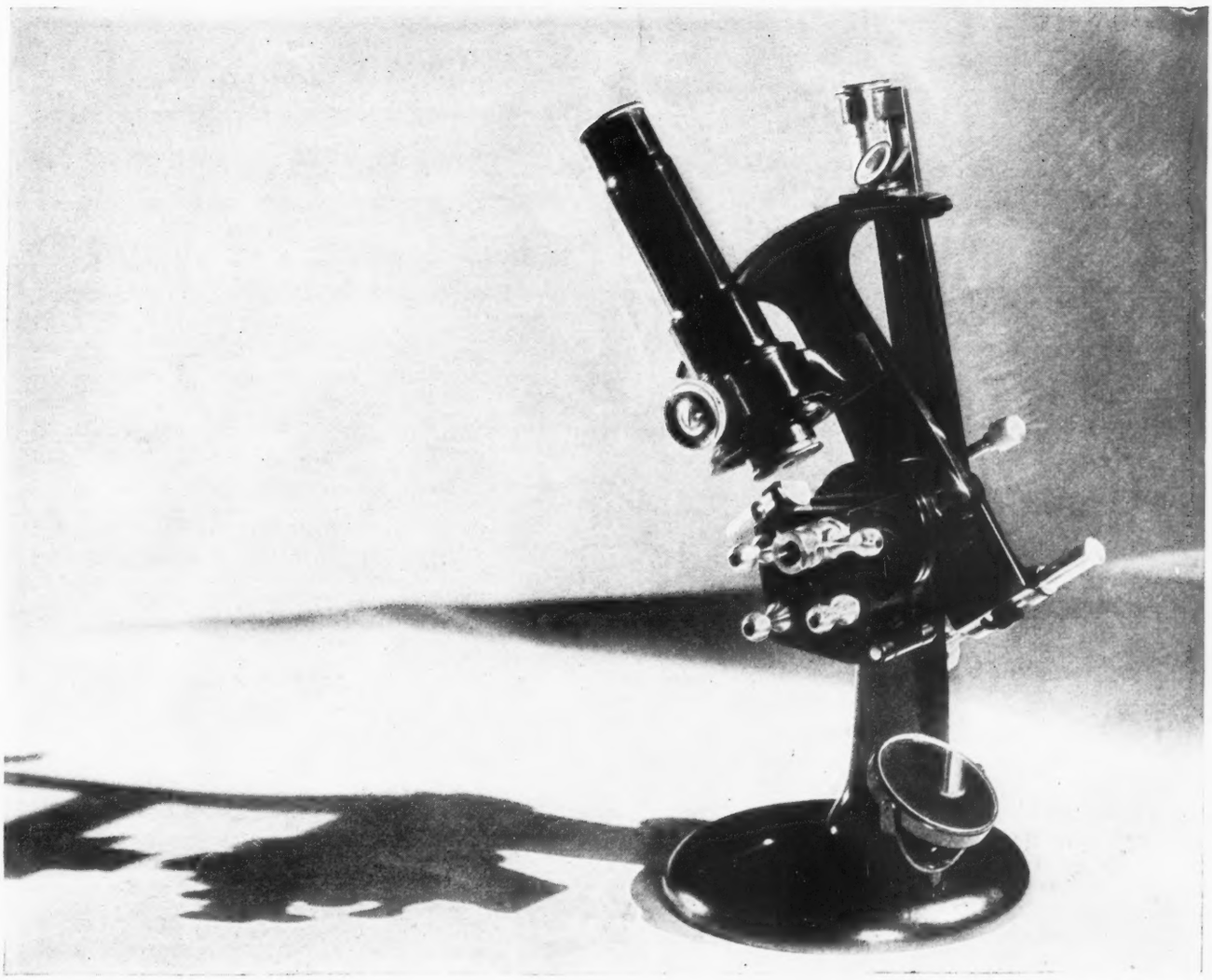
WALTER S. GIFFORD, DIRECTOR

Committee on Mobilization of Relief Resources

Owen D. Young

OWEN D. YOUNG, CHAIRMAN

The President's Organization on Unemployment Relief is non-political and non-sectarian. Its purpose is to aid local welfare and relief agencies everywhere to provide for local needs. All facilities for the nation-wide program, including this advertisement, have been furnished to the Committee without cost.



(Photograph made with Bausch & Lomb Protar Lens)

The Laboratory Behind the Product

THE efficiency of the laboratory that controls production is usually the measure of the quality of the product. Precision optical instruments give the laboratory the means for the most rigid and uniform quality control.

Wherever the dispersion or refractive index of a substance is an indication of its qualities, the B & L Abbe Refractometer will determine them. Such industrial uses as the control of boiling processes; the identification of oils, fats and waxes; the determination of the purity and strength of a substance—all make this instrument indispensable in the industrial laboratory.

This Abbe Refractometer is simple and easy to operate, yet highly accurate. It reads a wide range of indices which makes it an instrument with an exceptional number of applications.

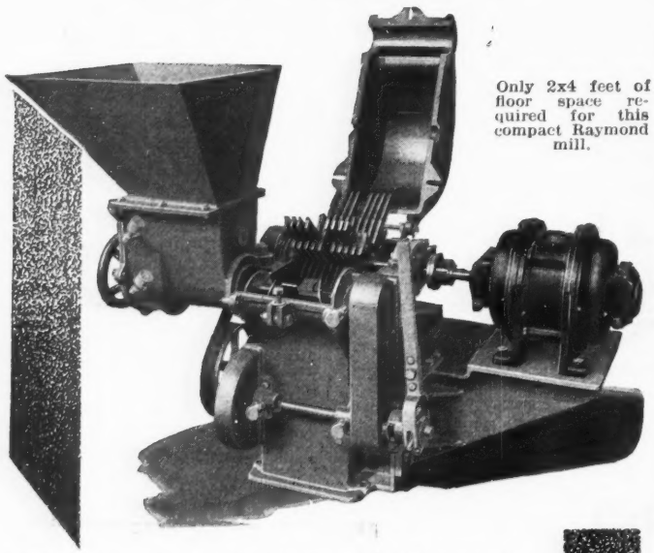
Write for complete information.

•

BAUSCH & LOMB OPTICAL CO.,
603 St. Paul Street, Rochester, N. Y.

BAUSCH & LOMB

"All-Service" Pulverizer



Only 2x4 feet of floor space required for this compact Raymond mill.

CHECK up on the advantages of the Raymond No. 00 Screen Pulverizer, if your product is one which requires fine grinding, smooth blending or dry mixing with other powdered materials.

This *low-cost producer* is showing extra large economies in food manufacturing plants on a variety of products:—

It is reducing a mixture of salt and spices to 40-mesh fineness at the rate of 500 pounds per hour.

It is pulverizing malted milk and dried milk to a fineness of 92% through 100-mesh at from 750 to 1000 pounds per hour.

It is handling a combination of cocoa, sugar and dried whole milk — grinding and blending the ingredients to a thorough mixture of uniform fineness.

The Raymond Screen Mill has a wide range of uses in the pulverizing of sugar, spices, cereals, dried yeast and many other materials to superfine powders or granular form.

COUPON brings full particulars — mail it today.

RAYMOND BROS. IMPACT PULVERIZER CO.
Main Office and Works
1310 North Branch Street, Chicago
342 Madison Avenue, New York — Subway Terminal Bldg., Los Angeles

Raymond Bros. Impact Pulverizer Co.
1310 North Branch Street, Chicago, Ill.

Gentlemen:
Please mail me a copy of the *Screen Pulverizer Bulletin.* I am interested in pulverizing .....
(Product)

Name of Company .....
Individual and Title .....
Address .....
City ..... State .....

It pays to be careful about cleaning!

SANITATION is an important part of food plant operation. Carelessness here may lead to food contamination with consequent injury to reputation and sales.

Make certain of scrupulous cleanliness by using Oakite for cleaning vats, kettles, filling machine and other equipment. Brushing and scrubbing are reduced to a minimum. Oakite quickly removes every trace of fruit juices, dressings, food or other deposits without the slightest injury to the washed surfaces.

Let our nearby Service Man tell you how this effective detergent can help you maintain high sanitary standards at lower costs. Write us today and we will have him call.

Manufactured only by
OAKITE PRODUCTS, INC., 26G Thames St.,
NEW YORK, N. Y.

OAKITE
TRADE MARK REG. U.S. PAT. OFF.
Industrial Cleaning Materials and Methods

COMPLETE PROTECTION FOR ALL WALL OPENINGS

Jamison and Stevenson products include doors, windows, ice chutes and refrigerator fronts to meet every operating need and every temperature condition — all backed by a guarantee of service.

Write for catalog.

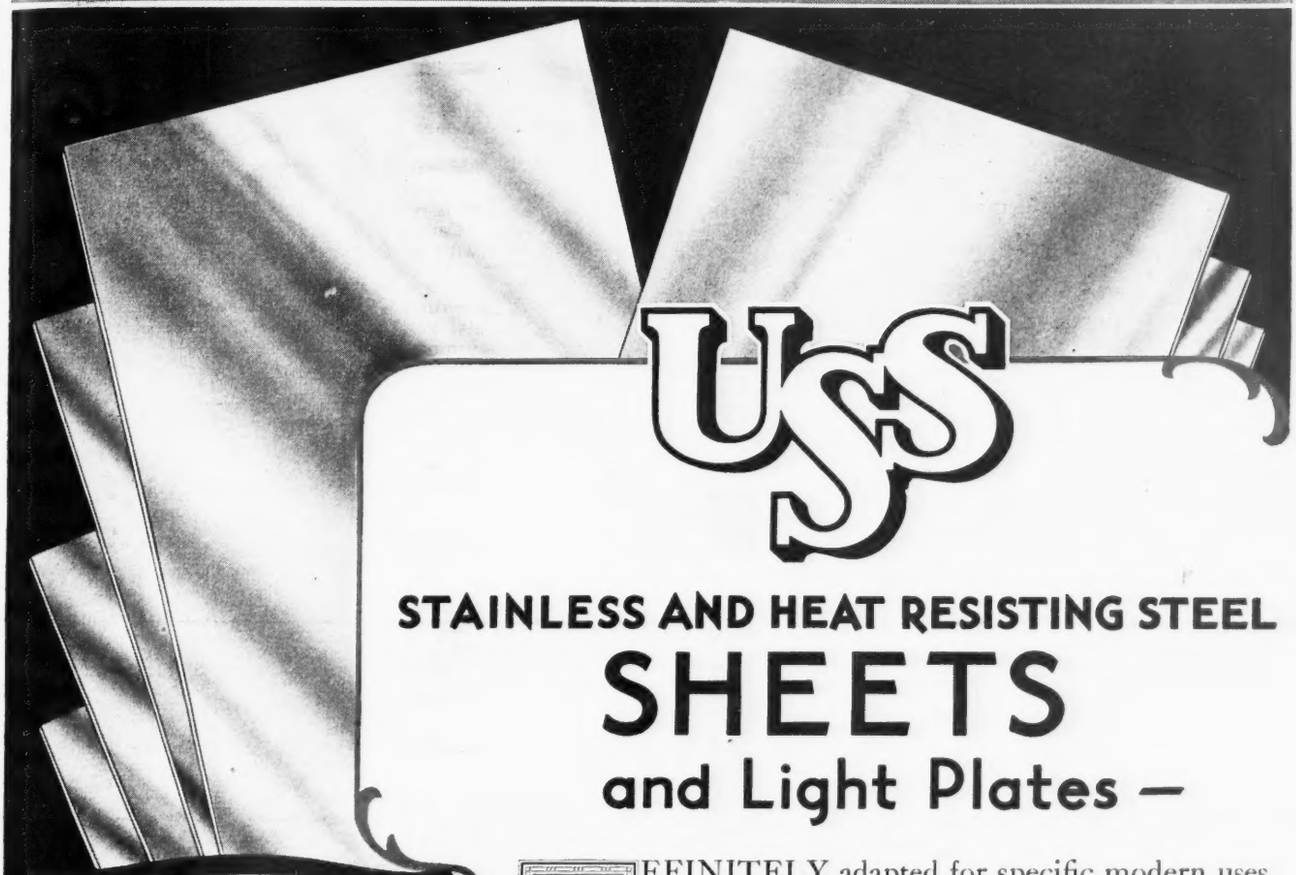
JAMISON COLD STORAGE DOOR CO.
CONSOLIDATING JAMISON COLD STORAGE DOOR CO., INC.
AND STEVENSON COLD STORAGE DOOR CO.
HAGERSTOWN, MARYLAND, U.S.A.

Jamison & Stevenson Cold Storage Doors

OLDEST and LARGEST makers of Cold Storage DOORS

BRANCHES, Chicago, New York St. Louis, Chester, Pa., San Francisco, Dallas. Southern Ice Supply Co., Marietta, Ga. Gay Engineering Co., Los Angeles. D. E. Fryer & Co., Seattle and Spokane. Foreign: London, Honolulu, Japan.

-AMERICAN-



USS

STAINLESS AND HEAT RESISTING STEEL

SHEETS

and Light Plates —

Inquiries regarding any application of sheets or light plates, or any product fabricated from either, will be given careful attention. Send for literature.

Chromium-Alloy Steels	Chromium-Nickel Steels
Ferritic	*Austenitic*
USS 12	USS 18-8
USS 17	USS 18-12
USS 27	USS 25-12

USS Chromium-Nickel Alloy Steels are produced under licenses of the Chemical Foundation, Inc., New York; and Fried. Krupp A. G. of Germany.

DEFINITELY adapted for specific modern uses. Very thorough metallurgical research preceded the commercial production of USS Chromium-Nickel Steels. The performance, not of one alloy but of many, was observed and studied under various conditions for the best combination of properties obtainable. No one composition was found specially suitable for all requirements — but a series of alloy steels, each calculated to give maximum satisfaction and economy within a certain range of use, was the outcome.

These USS Stainless and Heat Resisting Steels are offered by this Company in carefully manufactured Sheets and Light Plates to meet the technical demands of industry. Correspondence is invited, and full information will be given gladly on these grades and their particular qualities.

This Company manufactures Black and Galvanized Sheets, Formed Roofing and Siding Products, Special Sheets, Tin and Terne Plates for all purposes.

USS STEEL

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

KEYSTONE AMERICAN

PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES:

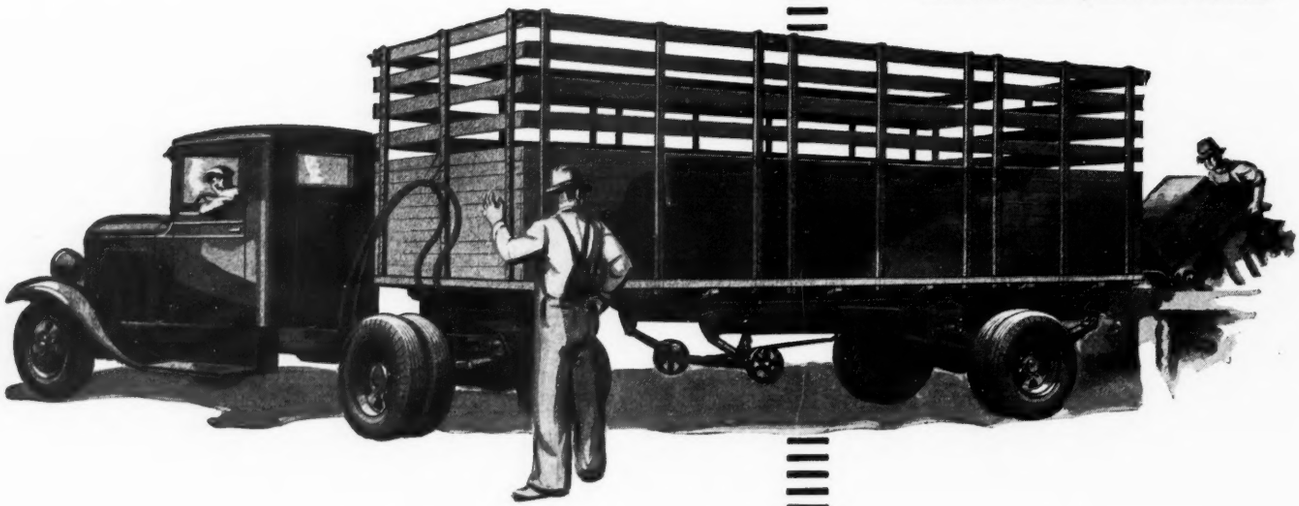
American Bridge Company
American Sheet and Tin Plate Company
American Steel and Wire Company
Carnegie Steel Company
Columbia Steel Company
Cyclone Fence Company
Federal Shipb'ldg. & Dry Dock Co.
Illinois Steel Company
Minnesota Steel Company
National Tube Company
Oil Well Supply Company
The Lorain Steel Company
Tennessee Coal, Iron & Railroad Co.
Universal Atlas Cement Company

Pacific Coast Distributors—Columbia Steel Company, Russ Building, San Francisco, Calif. *Export Distributors*—United States Steel Products Company, 30 Church Street, New York, N. Y.

Announcing the New Low-Priced REO TRACTOR TRAILER UNIT

$1575

16,000 LBS. GROSS CAPACITY. 4 CYL. TRACTOR AND TRAILER CHASSIS. COMPLETE WITH BODY $1800 F. O. B. LANSING



THE greatest value in truck and trailer history. A new Reo combination of 16,000 lbs. gross capacity at an astonishingly low price. . . . The Reo tractor is equipped with standard Martin rocking fifth wheel and automatic locking mechanism. Both tractor and trailer have coordinated hydraulic brakes on all six wheels. . . . The heavy-channeled 16′ trailer frame has six cross braces; helper springs are standard on both units. Sturdy trailer support legs, forged radius rods and interchangeable Spoksteel wheels are other outstanding features. Write or call your Reo dealer for complete information.

REO MOTOR CAR COMPANY - LANSING - TORONTO

Reo Trucks and Speed Wagons range from 1½-ton to 4 tons. Prices $625 to $2800, chassis f. o. b. Lansing

THE NEW 1½ TON REO SPEED WAGON

SEARCHLIGHT SECTION

EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or SPECIAL

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 5 cents a word, minimum $1.00 an insertion, payable in advance.

Positions Vacant and all other classifications 10 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH.

1 inch $5.00
2 to 3 inches..... 4.75 an inch
4 to 7 inches..... 4.50 an inch

Other spaces and contract rates on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page. Food Industries

COPY FOR NEW ADVERTISEMENTS RECEIVED UNTIL 3 P. M. ON THE 24TH FOR THE ISSUE OUT THE 2ND OF THE FOLLOWING MONTH

POSITIONS WANTED

HAVE broad experience in food industry as plant manager, chemical engineer, chemist. Experience includes production, development, research, laboratory work. Have proven executive and profit producing capabilities. Formerly employed by state, government and large industrial companies. University graduate. Good references concerning character and ability. Good reason for seeking new connection. PW-96, Food Industries, 520 No. Michigan Ave., Chicago, Ill.

SUPERINTENDENT - CHEMIST, experienced manufacture and refining, sugar and alcohol, both New York and Spanish-American refineries. Fluent Spanish and French. Specialist in modern packaging. Qualified for supervision and chemical control, any sugar plant, boneblack or vegetable carbon refinery, many food plants, investigations, reports, soil fertility surveys, etc. Member American Institute of Chemical Engineers. 41 and married. T. H. Murphy, 82 Caryl Ave., Yonkers, N. Y.

Institutional-Chain Store-Jobbing Trade
(Food Line)

Salesman with a valuable contac with chain grocers, wholesalers, hotels, institutions in Boston and New England seeks a connection Twelve years' experience calling on this trade Can furnish A-1 references. Would like to handle a new specialty or any food product of merit. Write,

JOSEPH A. DUFFLEY
36 Clyde St., Belmont, Mass.

SEARCHLIGHT SERVICE

Covers the Advertising of

Agencies Wanted
Agents Wanted
Auction Notices
Bids Wanted
Books and Periodicals
Buildings for Sale
Business Opportunities
Civil Service Opportunities
Contracts to Be Let
Contracts Wanted
Educational
Employment Agencies
Foreign Business
For Exchange
For Rent
Franchises
Labor Bureaus
Machinery Wanted
Partners Wanted
Patent Attorneys
Patents for Sale
Plants for Sale
Positions Vacant
Positions Wanted
Property for Sale
Proposals
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Second Hand Equipment
For Sale For Rent
Exchange Wanted
Specialties
Tutoring
Miscellaneous For Sale, For Rent and Wanted

Address
SEARCHLIGHT DEPT.
330 West 42d Street, New York

REPRESENTATIVES WANTED

Wanted: Sales Representative

to sell on a commission a very different and exclusive line of relishes, chutneys, preserves in United States and Canada. Repeat orders always follow. Representatives desired with experience in selling food specialties, and having acquaintance with hotels, institutions. List dealers, etc. References required. RW-95, Food Industries, 520 No. Michigan Ave., Chicago, Ill.

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Food Industries, published monthly at New York, N. Y., for October 1, 1931.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Food Industries, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 10th Ave. & 36th St., N. Y. C. Editor, Laurence V. Burton, 10th Ave. & 36th St., N. Y. C. Managing Editor, Graham L. Montgomery, 10th Ave. & 36th St., N. Y. C. Business Manager, M. A. Williamson, 10th Ave. & 36th St., N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 10th Ave. & 36th St., N. Y. C. Stockholders of which are: James H. McGraw, 10th Ave. & 36th St., N. Y. C. James H. McGraw, Jr., 10th Ave. & 36th St., N. Y. C. James H. McGraw, James H. McGraw, Jr and Malcolm Muir, 10th Ave. & 36th St., N. Y. C., Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw. Curtis W. McGraw, 370 Seventh Ave., N. Y. C. Donald C. McGraw, 10th Ave. & 36th St., N. Y. C. Harold W. McGraw, 285 Madison Avenue, N. Y. C. Anne Hugus Britton, 10th Ave. & 36th St., N. Y. C. Mason Britton, 10th Ave. & 36th St., N. Y. C. Edgar Kobak, 10th Ave. & 36th St., N. Y. C. Grace W. Mehren, 2440 Lakeview Ave., Chicago, Ill. J. Malcolm Muir & Guaranty Trust Co. of New York, Trustees for Lida Kelly Muir, 524 Fifth Ave., N. Y. C. F. S. Weatherby, 271 Clinton Road, Brookline, Mass. Midwood Corporation, Madison, N. J., Stockholders of which are: Edwin S. Wilsey, Madison, N. J. Elsa M. Wilsey, Madison, N. J.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

C. H. THOMPSON, Secretary.

McGRAW-HILL PUBLISHING COMPANY, INC.

Sworn to and subscribed before me this 28th day of September, 1931.

[SEAL] H. E. BEIRNE,
Notary Public N. Y. Co. Clk's No. 203, Reg. No. 3B102. Kings Co. Clk's No. 636, Reg. No. 3129.
(My Commission expires March 30, 1933)

FOR SALE

Copper Steam Jacketed Kettles, Dough and Food Product Mixers, Bottle Washing Machines, Copper and Glass Lined Tanks, Filters, Filter Presses, Mills, etc.

We also purchase food product equipment. What have you to offer?

Loeb Equipment Co.
618-620 W. Lake St., Chicago, Ill.

Special Offerings

in PFAUDLER steam-jacketed TANKS and KETTLES.

also Wood TANKS and CASKS, all kinds. BOTTLERS' MACHINERY, WASHERS and RINSERS, FILLING and CAPPING Machines, PASTEURIZERS and LABELERS, FILTERS and FILTER PRESSES, every size and style, ROTARY STEAM DRYERS.

Write for our large illustrated CATALOG and Price Lists.

UNIVERSAL COMPANY
3625 Superior St., Detroit, Mich.

NEW AND REBUILT

Buffalo Nut and Food Chopper, motor drive.
Day Clipper Egg Beaters, belt drive.
Double Pan Rack Trucks on casters.
Dough Mixers, single and double arm.
Leonard Date Pitter, motor drive.
Motors, D.C., 230 volt, 15 to 35 hp.
Steam Jacketed Copper Kettles, 10 gal. to 350 gal. capacity, with and without agitators, guaranteed steam pressure.

SAVAGE BROS. CO.
Since 1855—Candy Machinery—Coppersmiths
2638 Gladys Ave., Chicago, Ill.

REBUILT MACHINERY

Send for latest Bulletins listing largest stock of Food Products Machinery, Mixers, Fillers, Dryers, Grinders, Filter Presses, Kettles, Mills, Vacuum Pans, Tanks, Pumps, etc.

We buy your idle Machinery.

CONSOLIDATED PRODUCTS CO., INC.
13-17 Park Row, New York. BArclay 7-0600

Copper, Steam Jacket, Kettles

Used Kettles 20 to 300 gallon, also new ones.

THOS. BURKHARD, INC.
494-496 Flushing Ave., Brooklyn, N. Y.
Coppersmiths since 1836

PROFESSIONAL SERVICES

FRANK C. GEPHART, Ph.D.

Research and Consulting Chemist

SPECIALIST IN THE CHEMISTRY OF FOOD AND ITS INDUSTRIAL APPLICATIONS SINCE 1906

Products developed, standardized, evaluated. Special problems investigated.

Office and Laboratories
23 East 31st St., New York

T. B. WAGNER
52 Vanderbilt Ave., New York, N. Y.
Consulting Chemical Practice
Chemical and Industrial Engineering
SPECIALIZED SERVICE TO FOOD and MILLING INDUSTRIES:

Developing new products and markets.
Enhancing returns from by-products.

FOOD RESEARCH LABORATORIES, Inc.
Philip B. Hawk, Director
BIOCHEMISTS TO THE FOOD INDUSTRIES
Investigation, Consultation, and Control.
Specialists in
VITAMIN ASSAYS
Food and Medicinal Products Developed, Tested and Standardized.
114 E. 32nd St., New York
Member Ass'n of Consulting Chemists and Chemical Engineers

SWC — A NATIONAL ORGANIZATION FOR CONSTRUCTIVE SERVICE

Scovell, Wellington and Company

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MANAGEMENT ENGINEERS

10 EAST 40TH STREET, NEW YORK

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KANSAS CITY SAN FRANCISCO
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Applied Sugar Laboratories, Inc.

Consultants on Food Manufacturing Problems and Service Work to Manufacturers' Customers

ANALYTICAL—PROCESS CONTROL—RESEARCH

111 WALL STREET *Telephone* DIGBY 4-5554 NEW YORK CITY

Pease Laboratories, Inc.
39-41 West 38th St., New York City

Complete Service to Food Packers
Food Preparation, Packing and Processing

Heat Penetration Determinations
Nutritional, Chemical and Bacteriological Research

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PHOTOMICROGRAPHS FOR INDUSTRY

Technical and Scientific Photographs made through the microscope, for the comparison of materials.

GRAVELLE PHOTOMICROGRAPHS — For Research, Development, Control and Advertising.

114 Prospect St., South Orange, N. J.
Telephone South Orange 2-2791

Skinner & Sherman
Incorporated
Chemists and Bacteriologists

Analyses, Research, and Consultation on Foodstuffs and Manufacturing Processes.

246 Stuart Street
Boston, Mass.

Dr. HENRY ARNSTEIN
191 E. Roosevelt Boulevard
PHILADELPHIA, PA.

Specialists in the utilization of natural resources, the elimination of waste and the recovery of by-products. Complete chemical and food producing plants constructed and operated. Technical advisor to the governments of Argentina, Brazil, Colombia, Cuba, etc.

PACINI LABORATORIES
9 So. Clinton Street, Chicago, Ill.
A. J. Pacini, Director

Vitamin Assaying

Biochemical and Nutritional Investigations

Development, Standardization and Testing of Food and Medicinal Products

Pioneers in Industrial Photochemistry

LLOYD A. HALL
Research and Consulting Chemist
Specializing in the Food Industries
Analyses—Research—Products Developed—Investigations
Consultation and expert Testimony.
1415 West 37th Street, Chicago, Ill.

FOOD PLANTS—
are generally dependent on the services of the professional consultant for the design of new plants, the perfecting or introducing of new processes, for research work, or for any chemical and scientific work that involves anything outside of ordinary plant routine.
Consult the men listed in the "Professional Service Section" of Food Industries when such problems arise.

This is a CALL *to* ARMS

THESE are serious times. Consumption of canned foods must be made to increase—NOW. Prices cannot be moved up from the bottom until the supply is cut down by consumption. The need is imperative. *Something must be done.*

Something is being done. Something big—impressive—powerful. The canners of the country—through their national association—are about to launch an action-compelling advertising drive—underwritten by the principal tin plate manufacturers and can companies. It will awaken 18,000,000 housewives of America to the economy, convenience, wholesomeness of canned foods. It creates the big opportunity to speed the movement of canned foods across the counter.

November 7th is the date it starts. On that day the first full page advertisement appears in the Saturday Evening Post. The second comes November 21st. From then on, an increasingly forceful campaign in *five* national magazines: Good Housekeeping, Delineator, McCall's, Ladies' Home Journal, Saturday Evening Post.

But remember this—*advertising alone* won't do the job. It never has—it never will. Hard work with the trade *plus* advertising will do the job—and the more hard work, the better the job will be. *The National Canned Food Advertising Campaign must not fail.* But it *can* fail and it *will* fail unless you and every canner in this country get into the firing line and work for success with all the merchandising resourcefulness you've got.

You and you alone are the keystone of this campaign. If you side step the job—the responsibility of work—the job and the work won't get done. What will happen then? The Canned Food Industry will *not* get results—will *not* move goods—will *not* lift prices—will *not* bring back the proper balance between supply and demand.

Arouse your salesmen. Arouse your brokers. Arouse your jobbers. Arouse your retailers. Get retail displays of canned foods—retail advertising of canned foods—specials on canned foods. Think hard. Work hard. Muster every ounce of brain and energy at your command. Tie up with this campaign—merchandise it—push it—talk it. *It won't work for you unless you work for it.*

The National Canned Food Advertising Campaign *must not fail.*

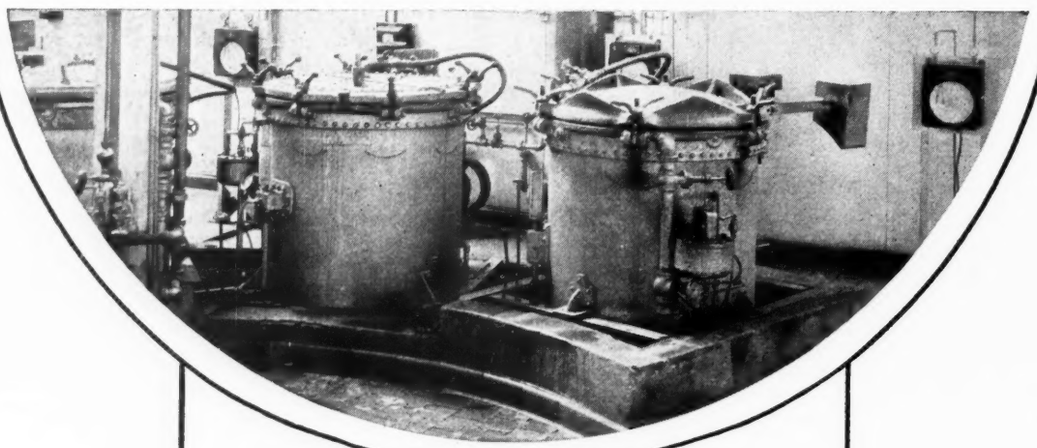
NATIONAL CANNERS ASSOCIATION
WASHINGTON, D. C.

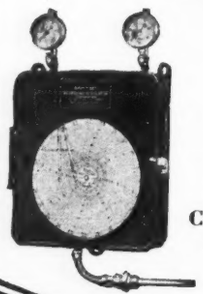
Set it...forget it...
every batch is the same!

Tycos Recording Regulators are regarded as necessities in progressive food plants, as more and more plants install them. Why? Because *Tycos* Recording Regulators absolutely eliminate all chances for error in timing and controlling cooking temperatures. They control the steam. Timing starts when the batch temperature reaches the predetermined point. Cooking continues until the time element shuts off the steam. The next batch follows the same exact procedure, and the next—and next—.

No wonder so many manufacturers who cannot afford to market a non-uniform product, install *Tycos* Regulators on cooking, sterilizing, canning, yes and refrigerating equipment.

***Tycos* CONTROL • *Tycos* CONTROL • *Tycos* CONTROL • *Tycos* CONTROL**





For full details, address

Taylor

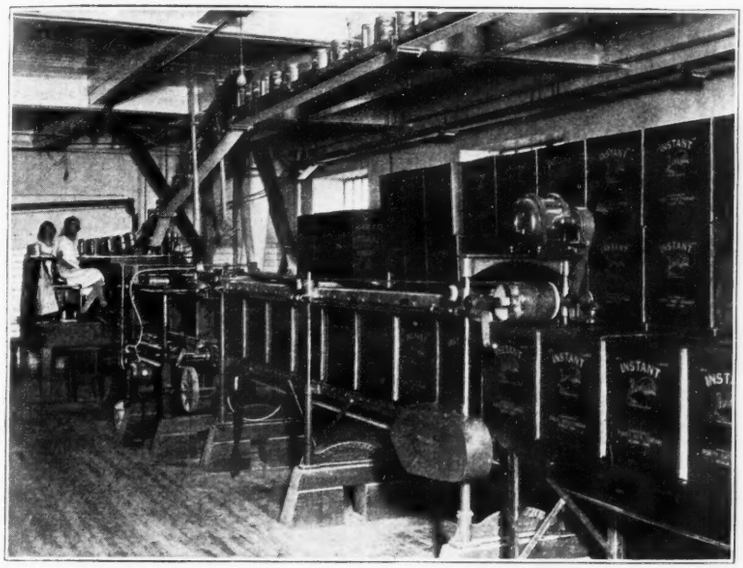
Instrument Companies

ROCHESTER, N. Y., U. S. A.

Canadian Plant, *Tycos* Building, Toronto

Manufacturing Distributors in Great Britain, Short & Mason, Ltd., London

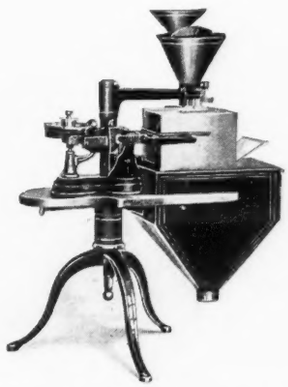
More than 2000 Manufacturers and packers now use Packomatic Machinery!



A PACKOMATIC CONTAINER SEALING MACHINE
PURITY OATS COMPANY, KEOKUK, IOWA

MR. RICH SAYS:

"One of the reasons for our introducing your machinery into our plant was because we found, after considerable investigation, that the quality of your merchandise in your line is comparable to our merchandise in our line. More of a compliment than this for us to pay to anyone would be an impossibility."



PACKOMATIC (SCOTT) NET WEIGHER

A unique patented friction compensating device makes it an unfailing gravity type machine. It will accurately operate at speed of (30) per minute.

Now, while things are normal, is a perfect time to take stock of your equipment. Modernize it — get it in shape for speedy, economical production. You'll need it when things break.

Let us help you — We've helped more than two thousand manufacturers and packers in the last ten years. A PACKOMATIC ENGINEER will help you analyze your equipment and packaging problems, without obligation. Let's get together and talk things over now. Write wire, or 'phone. We'll meet you any time, any place.

PACKOMATIC
PACKAGING MACHINERY

J. L. FERGUSON COMPANY, JOLIET, ILLINOIS

Branch Offices: NEW YORK ST. LOUIS LOS ANGELES

1932 Production Costs MUST be cut right down to the bone

There is no alternative.

Either profits must be made on a current volume of business or there won't be any incentive to stay in business.

We're not recommending investing a dollar in any kind of equipment until it has proved beyond the shadow of a doubt that it will cut costs.

What we do recommend is that you investigate the possible savings in grinding costs by means of MIKRO-PULVERIZER — and that NOW is the best time to do it, even though you may not be ready at the moment to buy.

The fact that MIKRO-PULVERIZER can and does prove its effectiveness in reducing pulverizing costs *before installation,* leads us to make the following suggestion:

Send us samples of your product to test in our laboratory. We will duplicate your production requirements and report our findings to you in complete detail, giving you an estimate of the savings you can make in your pulverizing costs. And it won't cost you a cent or obligate you in any way.

May we make another suggestion:

Why not settle the question of probable savings immediately — so there won't be any delay in trimming costs and making profits. Write us today.

Pulverizing Machinery Co.

30 Church Street, New York City

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Gentlemen:

Please send your booklet describing the MIKRO-PULVERIZER. I am interested in reducing pulverizing costs and would appreciate your suggestions as to how this can be accomplished. It is understood that this request incurs no obligation.

Name ..... Company .....

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• TO ADVERTISERS •

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	Page
Allegheny Steel Co.....Back Cover	
Allis-Chalmers Co.	24
American Can Company	14
American Gas Ass'n	17
American Sheet & Tin Plate Co.	47
American Stainless Steel Co.	5
American Utensil Co.	38
Armstrong Cork Insulation Co.	18
Associated Cooperage Industries of America	41
Austin Co.	21
Bausch & Lomb Optical Co.	45
Bostitch Sales Co.	4
Bowen Research Corp.	31
Bristol Co.	16
Buffalo Forge Co.	34
Carbondale Machine Co.	25
Carthage Machine Co.	30
Century Electric Co.	23
Chicago Tribune.....3rd Cover	
Continental Can Co.	20
Cream City Boiler Co.	31
Diamond Crystal Salt Co.	11
Drehmann Paving & Construction Co.	36
Ferguson Co., J. L.	53
Firestone Tire & Rubber Co.	6
Frick Company	22
Fulton Sylphon Co.	28
General Motors Truck Co.....8-9	
Graver Tank & Mfg. Corp.	38
Innis, Speiden & Co.	26
International Harvester Co.	13
International Nickel Co.	15
Jamison Cold Storage Door Co.	46
Kalamazoo Vegetable Parchment Co.	27
Lamson Company	10
McGraw-Hill Book Co.	22
Mears-Kane-Ofeldt, Inc.	42
Merck & Co.	40
Morehead Mfg. Co.	19
Moto Meter Gauge & Equipment Corp.	19
National Adhesive Corp.	36
National Canners Association	51
National Steel Barrel Co.	35
Oakite Products, Inc.	46
Package Machinery Company	12
Pfaudler Co.	43
Powers Regulator Co.	42
Pressed Steel Tank Co.	29
Professional Service	50
Pulverizing Machinery Co.	54
Raymond Bros. Impact Pulverizer Co.	46
Reo Motor Car Co.	48
Robinson Mfg. Co.	33
Sarco Company, Inc.	7
Searchlight Section	49
Shriver & Co., T.	38
Stokes Machine Co., F. J.	34
Sylvania Industrial Corp.	39
Tagliabue Mfg. Co., C. J.	42
Taylor Instrument Co.	52
Technical Sales Corp.	30
United Chemical & Organic Products Co.....2d Cover	
Viking Pump Company	26
Vilter Mfg. Co.	40
Wolf Company	37
Worthington Pump & Machinery Corp.	32

SEARCHLIGHT SECTION
Classified Advertising

BUSINESS OPPORTUNITIES	49
EMPLOYMENT	49
REPRESENTATIVES WANTED	49
USED AND SURPLUS EQUIP.	
Burkard Inc., Thos.	49
Consolidated Products Co.	49
Loeb Equipment Co.	49
Savage Bros.	49
Universal Co.	49
Professional Services	**50**

Write to the Equipment Information Bureau of* FOOD INDUSTRIES *for "where-to-buy" data on any products on which you would like further details.

An unusual opportunity for food manufacturers

THE

CHICAGO TRIBUNE SCHOOL OF COOKERY

SIXTEEN SESSIONS

NOV. 3 TO 24 INC.

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Eastern Adv. Office	Southern Adv. Office	New England Adv. Office	Western Adv. Office
NEW YORK	ATLANTA	BOSTON	SAN FRANCISCO
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Viking Pump Company	26
Vilter Mfg. Co.	40
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Insolubility

both your product and your equipment

Allegheny Metal is insoluble in its contact with all foods. Hence it's the safe metal to use.

ALL food products are better made with Allegheny Metal equipment if they have any corrosive action whatever. Our experience has showed how Allegheny Metal has improved scores of food products . . . made them more uniform . . . saved batches that might otherwise have been spoiled.

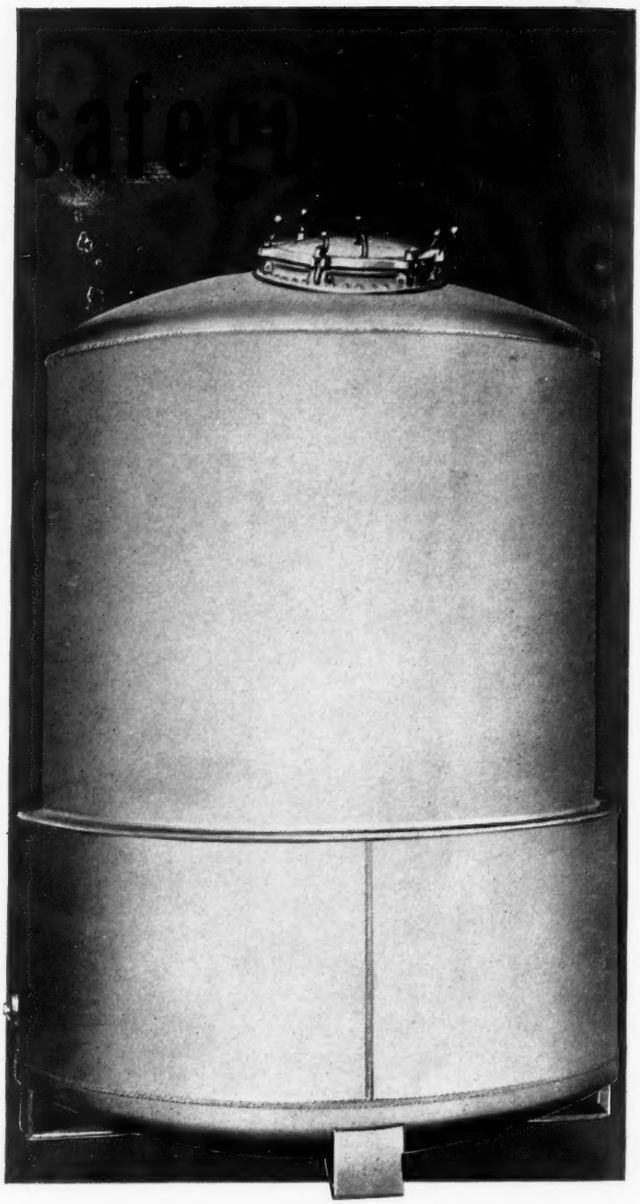
Allegheny Metal works such wonders in food product manufacturing because it is insoluble in all its contact with foods . . . even with those which depend primarily on a strong acid for their flavor and zest.

In addition, Allegheny Metal is as easy to clean as glass. Its strength is far greater than that of mild steel—strong enough to support itself and a heavy batch, without strong reinforcement.

Many of the most widely sold food products today are prepared in cookers, tanks and vats of Allegheny Metal. Perhaps you're acquainted with some of the firms using it. Inspect their equipment. Ask their opinion of Allegheny Metal. Specify it in your next order for equipment.

ALLEGHENY STEEL COMPANY, Brackenridge, Pa.

Offices: New York, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Philadelphia, St. Louis, Washington, D. C., Milwaukee, Los Angeles. *Warehouse Stocks:* Joseph T. Ryerson & Son, Inc.—Chicago, Cleveland, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Boston, Jersey City, Philadelphia . . . *In Canada:* Samuel, Son & Co., Ltd., Toronto.



GOOD FOR A LIFETIME *because it's made of Allegheny Metal, insoluble in food handling. This kettle, six feet in diameter, is used for making jams and jellies.*

QUICK FACTS

1. Resists more corrosive agents than any other alloy.
2. Can be drawn, stamped, machined, spun, cast, forged.
3. Far stronger than mild steel.
4. Will take any finish from dull to mirror.
5. Is non-magnetic.
6. Resists denting and abrasion.
7. Is readily annealed; may be welded and soldered.
8. Is produced in practically all commercial forms.
9. Immune to chemical reactions resulting from cooking and preparation of food . . . does not affect flavor, color or purity of any food.

Manufactured pursuant to license from the Chemical Foundation, Inc., under basic patents No. 1,316,817 and No. 1,339,378

ALLEGHENY METAL